

# 20-COMM-E EtherNet/IP Adapter



**Allen-Bradley**

Series A FRN 2.xxx  
Series B FRN 4.xxx

User Manual



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Automation**

## Important User Information

Solid state equipment has operational characteristics differing from those of electromechanical equipment. *Safety Guidelines for the Application, Installation and Maintenance of Solid State Controls* (Publication SGI-1.1 available from your local Rockwell Automation sales office or online at <http://www.rockwellautomation.com/literature>) describes some important differences between solid state equipment and hard-wired electromechanical devices. Because of this difference, and also because of the wide variety of uses for solid state equipment, all persons responsible for applying this equipment must satisfy themselves that each intended application of this equipment is acceptable.

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Throughout this manual, when necessary we use notes to make you aware of safety considerations.



**WARNING:** Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.

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**Important:** Identifies information that is critical for successful application and understanding of the product.

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**ATTENTION:** Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you identify a hazard, avoid a hazard, and recognize the consequences.

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**Shock Hazard** labels may be located on or inside the equipment (e.g., drive or motor) to alert people that dangerous voltage may be present.

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**Burn Hazard** labels may be located on or inside the equipment (e.g., drive or motor) to alert people that surfaces may be at dangerous temperatures.

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## Summary of Changes

The information below summarizes the changes made to this manual since its last release (May 2007):

| Description of Changes                                                                                                                                                                                                            | Page                                        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|
| Reformatted document from half size (5.5 x 8.5 in.) to full size (8.5 x 11 in.)                                                                                                                                                   | Throughout manual                           |
| Revised Figures 2.2 and 2.3 to show PowerFlex 700H/S Frames 9 and larger. Added ground tab details in Figure 2.3.                                                                                                                 | <a href="#">2-4</a> and <a href="#">2-5</a> |
| Added "Flash Updating the Adapter" section.                                                                                                                                                                                       | <a href="#">3-18</a>                        |
| Added information for use with PowerFlex 750-Series drives.                                                                                                                                                                       | Throughout manual                           |
| Added "Using RSLinx Classic" section.                                                                                                                                                                                             | <a href="#">4-1</a>                         |
| Revised Tables 4.A, 4.B, and 4.C to include configured settings for Parameters 13 - [DPI I/O Cfg], 25 - [M-S Input], and 26 - [M-S Output].                                                                                       | <a href="#">4-17</a>                        |
| Added section "Limitations When Using PLC-5, SLC 500, and MicroLogix 1100."                                                                                                                                                       | <a href="#">4-21</a>                        |
| Added titles to the controller I/O image tables (Table 5.A through Table 5.F) for easier referral.                                                                                                                                | <a href="#">5-2</a> to <a href="#">5-5</a>  |
| Added footnotes to explicit messaging screen configuration tables for all controller type examples to clarify required settings for the Size in Words/Elements/Bytes fields when reading/writing to 16-bit and 32-bit parameters. | Throughout <a href="#">Chapter 6</a>        |
| The 20-COMM-E adapter firmware version 4.001 added support for use with PowerFlex 750-Series drives (included related information where applicable).                                                                              | Throughout <a href="#">Appendix C</a>       |



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## Related Documentation

| For:                                                                    | Refer to:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Publication                                                                                                  |
|-------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| EtherNet/IP                                                             | EtherNet/IP Media Planning and Installation Manual <sup>(1)</sup><br>EtherNet/IP Network Infrastructure Guidelines <sup>(1)</sup><br>EtherNet/IP Performance Application Solution                                                                                                                                                                                                                                                                                                                                                                                             | ODVA Pub. 148<br>ODVA Pub. 35<br>ENET-AP001                                                                  |
| DriveExplorer™                                                          | <a href="http://www.ab.com/drives/driveexplorer/">http://www.ab.com/drives/driveexplorer/</a> , and DriveExplorer online help <sup>(2)</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                  | —                                                                                                            |
| DriveTools™ SP (includes DriveExecutive™)                               | <a href="http://www.ab.com/drives/drivetools/">http://www.ab.com/drives/drivetools/</a> , and DriveExecutive online help <sup>(2)</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                       | —                                                                                                            |
| PowerFlex® 20-HIM-A3/-A5/-C3S/-C5S HIM<br>PowerFlex® 20-HIM-A6/-C6S HIM | PowerFlex 20-HIM-A3/-A5/-C3S/-C5S HIM Quick Reference<br>PowerFlex 20-HIM-A6/-C6S HIM (Human Interface Module) User Manual                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 20HIM-QR001                                                                                                  |
| PowerFlex® 70/70EC Drive                                                | PowerFlex 70 User Manual<br>PowerFlex 70/700 Reference Manual<br>PowerFlex 70EC/700VC Reference Manual                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 20A-UM001<br>PFLEX-RM001<br>PFLEX-RM004                                                                      |
| PowerFlex® 700/700VC Series A Drive<br>PowerFlex® 700VC Series B Drive  | PowerFlex 700 Series A User Manual<br>PowerFlex 700 Series B User Manual<br>PowerFlex 70/700 Reference Manual<br>PowerFlex 70EC/700VC Reference Manual                                                                                                                                                                                                                                                                                                                                                                                                                        | 20B-UM001<br>20B-UM002<br>PFLEX-RM001<br>PFLEX-RM004                                                         |
| PowerFlex® 700H Drive                                                   | PowerFlex 700H Installation Instructions<br>PowerFlex 700H Programming Manual                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | PFLEX-IN006<br>20C-PM001                                                                                     |
| PowerFlex® 700S Drive                                                   | PowerFlex 700S with Phase I Control Installation Manual (Frames 1...6)<br>PowerFlex 700S with Phase I Control Installation Manual (Frames 9 and 10)<br>PowerFlex 700S with Phase I Control User Manual (All Frame Sizes)<br>PowerFlex 700S with Phase I Control Reference Manual<br>PowerFlex 700S with Phase II Control Installation Manual (Frames 1...6)<br>PowerFlex 700S with Phase II Control Installation Manual (Frames 9...14)<br>PowerFlex 700S with Phase II Control Programming Manual (All Frame Sizes)<br>PowerFlex 700S with Phase II Control Reference Manual | 20D-IN024<br>PFLEX-IN006<br>20D-UM001<br>PFLEX-RM002<br>20D-IN024<br>PFLEX-IN006<br>20D-PM001<br>PFLEX-RM003 |
| PowerFlex® 700L Liquid-Cooled AC Drive                                  | PowerFlex 700L User Manual                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 20L-UM001                                                                                                    |
| PowerFlex® 750-Series AC Drives                                         | PowerFlex 750-Series Drive Installation Instructions<br>PowerFlex 750-Series Drive Programming Manual<br>PowerFlex 755 Drive Embedded EtherNet/IP Adapter User Manual<br>PowerFlex 20-750-20COMM Option Card                                                                                                                                                                                                                                                                                                                                                                  | 750-IN001<br>750-PM001<br>750COM-UM001<br>750COM-IN001                                                       |
| PowerFlex® Digital DC Drive                                             | PowerFlex Digital DC Drive User Manual                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 20P-UM001                                                                                                    |
| RSLinx® Classic                                                         | Getting Results with RSLinx Guide, and online help <sup>(2)</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | LINX-GR001                                                                                                   |
| RSLogix™ 5<br>RSLogix™ 500<br>RSLogix™ 5000                             | RSLogix 5 Getting Results Guide, and online help <sup>(2)</sup><br>RSLogix 500 Getting Results Guide, and online help <sup>(2)</sup><br>RSLogix 5000 Getting Results Guide, and online help <sup>(2)</sup>                                                                                                                                                                                                                                                                                                                                                                    | LG5-GR002<br>LG500-GR002<br>9399-RLD300GR                                                                    |
| ControlLogix® and 1756-ENBT or 1756-EN2T                                | EtherNet/IP Modules in Logix5000 Control Systems User Manual                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ENET-UM001                                                                                                   |
| PLC-5®                                                                  | Enhanced and Ethernet PLC-5 Programmable Controllers User Manual                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1785-UM012                                                                                                   |
| SLC™500 and 1747-L5-xxx                                                 | SLC 500 Modular Hardware Style User Manual                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1747-UM011                                                                                                   |
| MicroLogix™ 1100<br>MicroLogix™ 1400                                    | MicroLogix 1100 Programmable Controllers User Manual<br>MicroLogix 1400 Programmable Controllers User Manual                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1763-UM001<br>1766-UM001                                                                                     |

<sup>(1)</sup> Use this link to the ODVA EtherNet/IP library for these publications: <http://odva.org/Home/ODVATECHNOLOGIES/EtherNetIP/EtherNetIPLibrary/tabid/76/Default.aspx>

<sup>(2)</sup> The online help is installed with the software.

Documentation can be obtained online at <http://literature.rockwellautomation.com>. To order paper copies of technical

documentation, contact your local Rockwell Automation distributor or sales representative.

To find your local Rockwell Automation distributor or sales representative, visit [www.rockwellautomation.com/locations](http://www.rockwellautomation.com/locations).

For information such as firmware updates or answers to drive-related questions, go to the Drives Service & Support web site at [www.ab.com/support/abdrives](http://www.ab.com/support/abdrives) and click on the “Downloads” or “Knowledgebase” link.

## Rockwell Automation Support

Rockwell Automation, Inc. offers support services worldwide, with over 75 sales/support offices, over 500 authorized distributors, and over 250 authorized systems integrators located through the United States alone. In addition, Rockwell Automation, Inc. representatives are in every major country in the world.

### Local Product Support

Contact your local Rockwell Automation, Inc. representative for:

- Sales and order support
- Product technical training
- Warranty support
- Support service agreements

### Technical Product Assistance

For technical assistance, please review the information in [Chapter 7, Troubleshooting](#), first. If you still have problems, then access the Allen-Bradley Technical Support web site at [www.ab.com/support/abdrives](http://www.ab.com/support/abdrives) or contact Rockwell Automation, Inc.

## Conventions Used in This Manual

This manual provides information about the adapter and using it with PowerFlex 7-Class (Architecture-Class) drives. The adapter can be used with other products that support a DPI™ adapter, such as the DPI External Comms Kit (20-XCOMM-DC-BASE). Refer to the documentation for your product for specific information about how it works with the adapter.

The following conventions are used throughout this manual:

- Parameter names are shown in the format **Parameter xx - [\*]**. The xx represents the parameter number. The \* represents the parameter name—for example **Parameter 01 - [DPI Port]**.
- Menu commands are shown in bold type face and follow the format **Menu > Command**. For example, if you read “Select **File > Open**,” you should click the **File** menu and then click the **Open** command.
- The firmware release is displayed as FRN X.xxx. The “FRN” signifies Firmware Release Number. The “X” is the major release number. The “xxx” is the minor update number.
- RSLinx (version 2.51), RSLogix 5 (version 7.20), RSLogix 500 (version 7.20), and RSLogix 5000 (version 16) were used for the screen shots in this manual. Different versions of the software may differ in appearance and procedures.

## Notes:

## Getting Started

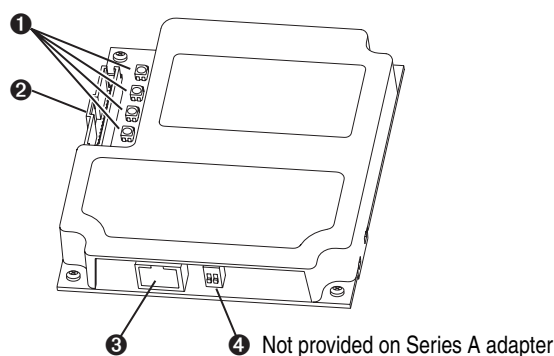
The adapter is intended for installation into a PowerFlex 7-Class drive and is used for network communication. The Series B 20-COMM-E adapter (FRN 3.xxx or later) can also be installed in an External DPI Comms Kit (20-XCOMM-DC-BASE).

For PowerFlex 755 drives, it is recommended to use its embedded EtherNet/IP adapter instead of the 20-COMM-E adapter to take advantage of the embedded adapter's advanced capability. When used with PowerFlex 750-Series drives (including the PowerFlex 753 drive), the 20-COMM-E adapter must have firmware version 4.001 (or later) and must be installed using the 20-750-20COMM Option Card. This manual includes information on using the 20-COMM-E adapter with the PowerFlex 753 drive, but it also applies to the PowerFlex 755 drive.

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## Components

Figure 1.1 Components of the Adapter



| Item | Part                   | Description                                                                                                                                      |
|------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| ①    | Status Indicators      | Four LEDs that indicate the status of the DPI, the adapter, and network connection. Refer to <a href="#">Chapter 7, Troubleshooting</a> .        |
| ②    | DPI Connector          | A 20-pin, single-row shrouded male header. An Internal Interface cable is connected to this connector and a connector on the drive.              |
| ③    | Ethernet Connector     | An RJ-45 connector for the Ethernet cable. The connector is CAT-5 compliant to ensure reliable data transfer on 100Base-TX Ethernet connections. |
| ④    | Web Pages Switch (SW2) | Enables or disables the adapter web pages. Refer to <a href="#">Setting the Web Pages Switch (Series B only) on page 2-2</a> . SW1 is unused.    |

## Features

The features of the adapter include:

- Typical mounting in a PowerFlex 7-Class drive. The Series B 20-COMM-E adapter (FRN 3.xxx or later) can also be installed in a DPI External Comms Kit and used with the kit's optional I/O board. See [Chapter 9, Using the Adapter in a DPI External Comms Kit \(20-XCOMM-DC-BASE\)](#) for more information.

### DPI External Comms Kit Compatibility

| 20-COMM-E Adapter |                   | Operation With                            |                                       |
|-------------------|-------------------|-------------------------------------------|---------------------------------------|
| Series            | Firmware Version  | DPI External Comms Kit (20-XCOMM-DC-BASE) | Optional I/O Board (20-XCOMM-IO-OPT1) |
| A                 | 2.xxx and earlier | No                                        | No                                    |
| B                 | 3.xxx and later   | Yes                                       | Yes                                   |

- Captive screws to secure and ground the adapter to the drive or, when mounted in a DPI External Comms Kit, to the kit's metal enclosure.
- Compatibility with various configuration tools to configure the adapter and connected drive. The tools include the PowerFlex HIM on the drive, and drive-configuration software such as DriveExplorer (version 2.01 or later) or DriveExecutive (version 3.01 or later). In addition, you can use a BOOTP server to configure the network address for the adapter.
- Status indicators that report the status of the drive communications, the adapter, and network. They are visible when the drive cover is open or closed.
- Parameter-configured I/O (Logic Command/Reference and up to four pairs of Datalinks) to accommodate application requirements.
- Explicit Messaging support.
- Master-Slave or Peer-to-Peer hierarchy that can be set up so that the adapter and connected PowerFlex drive transmit data to and from either a scanner or another PowerFlex drive on the network.
- User-defined fault actions to determine how the adapter and connected PowerFlex drive respond to:
  - I/O messaging communication disruptions (Comm Flt Action)
  - Controllers in idle mode (Idle Flt Action)
- Web pages, viewed using a web browser, that show information about the adapter, connected drive, and other DPI devices connected to the drive.
- Configurable e-mail messaging to desired addresses when selected drive faults occur and/or are cleared, and/or when the adapter takes a communication or idle fault action.
- Access to any PowerFlex drive and its connected peripherals on the network to which the adapter is connected.

## Compatible Products

DPI is a second generation peripheral communication interface and a functional enhancement to SCANport. The adapter is compatible with Allen-Bradley PowerFlex 7-Class drives and other products that support DPI. At the time of publication, compatible products include:

- PowerFlex 70/70EC drives
- PowerFlex 700/700VC drives
- PowerFlex 700H drives
- PowerFlex 700S drives
- PowerFlex 700L drives
- PowerFlex 750-Series drives <sup>(1)</sup>
- PowerFlex Digital DC drives
- DPI External Comms Kit
- SMC™ Flex

<sup>(1)</sup> The 20-COMM-E adapter must have firmware version 4.001 (or later) to be compatible with PowerFlex 750-Series drives.

## Required Equipment

### Equipment Shipped with the Adapter

When you unpack the adapter, verify that the package includes:

- ☐ One adapter
- ☐ A 2.54 cm (1 in.) and a 15.24 cm (6 in.) Internal Interface cable (only one cable is needed to connect the adapter to the drive; for which cable to use, see [Figure 2.2 on page 2-4](#))
- ☐ One *PowerFlex 7-Class DPI (Drive Peripheral Interface) Network Communication Adapter Installation Instructions* (publication 20COMM-IN004)



**TIP:** When mounting the 20-COMM-E adapter in a PowerFlex 750-Series drive, you must use a 20-750-20COMM Option Card (publication 750COM-IN001) and the adapter must have firmware version 4.001 (or later).

### User-Supplied Equipment

To install and configure the adapter, you must supply:

- ☐ A small flathead screwdriver
- ☐ Ethernet cable – refer to the *EtherNet/IP Media Planning and Installation Manual* (publication ENET-IN001)
- ☐ Ethernet switch – refer to the *EtherNet/IP Performance Application Solution* (publication ENET-AP001)
- ☐ Configuration tool, such as:
  - PowerFlex 7-Class HIM (20-HIM-xx)
  - DriveExplorer (version 2.01 or later)
  - DriveExecutive stand-alone software (version 3.01 or later) or bundled with the DriveTools SP suite (version 1.01 or later)
  - BOOTP Server (version 2.1 or higher) (network setup only)
- ☐ Controller configuration software (such as RSLogix 5/500/5000)
- ☐ A PC connection to the EtherNet/IP network

## Safety Precautions

Please read the following safety precautions carefully.

---



**ATTENTION:** Risk of injury or death exists. The PowerFlex drive may contain high voltages that can cause injury or death. Remove all power from the PowerFlex drive, and then verify power has been discharged before installing or removing an adapter.



**ATTENTION:** Risk of injury or equipment damage exists. Only personnel familiar with drive and power products and the associated machinery should plan or implement the installation, start up, configuration, and subsequent maintenance of the product using an adapter. Failure to comply may result in injury and/or equipment damage.



**ATTENTION:** Risk of equipment damage exists. The adapter contains ESD (Electrostatic Discharge) sensitive parts that can be damaged if you do not follow ESD control procedures. Static control precautions are required when handling the adapter. If you are unfamiliar with static control procedures, refer to *Guarding Against Electrostatic Damage* (publication 8000-4.5.2).



**ATTENTION:** Risk of injury or equipment damage exists. If the adapter is transmitting control I/O to the drive, the drive may fault when you reset the adapter. Determine how your drive will respond before resetting an adapter.



**ATTENTION:** Risk of injury or equipment damage exists. **Parameters 21 - [Comm Flt Action], 22 - [Idle Flt Action], and 41 - [Peer Flt Action]** let you determine the action of the adapter and connected drive if communications are disrupted or the controller is idle. By default, these parameters fault the drive. You can set these parameters so that the drive continues to run. Precautions should be taken to ensure that the settings of these parameters do not create a risk of injury or equipment damage. When commissioning the drive, verify that your system responds correctly to various situations (for example, a disconnected cable or a faulted controller).



**ATTENTION:** Risk of injury or equipment damage exists. When a system is configured for the first time, there may be unintended or incorrect machine motion. Disconnect the motor from the machine or process during initial system testing.



**ATTENTION:** Risk of injury or equipment damage exists. The examples in this publication are intended solely for purposes of example. There are many variables and requirements with any application. Rockwell Automation, Inc. does not assume responsibility or liability (to include intellectual property liability) for actual use of the examples shown in this publication.

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## Quick Start

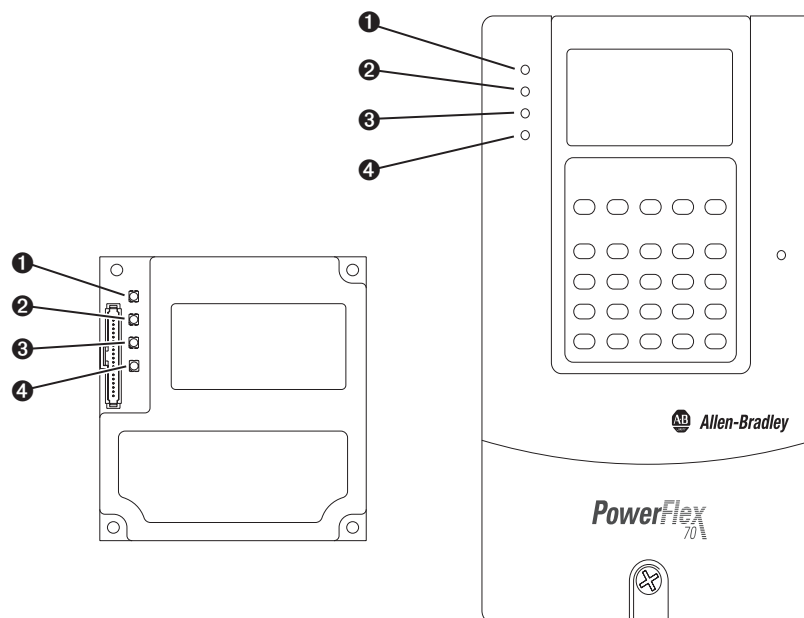
This section is provided to help experienced users quickly start using the adapter. If you are unsure how to complete a step, refer to the referenced chapter.

| Step | Action                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Refer to...                                                                                                                                                           |
|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <b>Review the safety precautions for the adapter.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Throughout This Manual                                                                                                                                                |
| 2    | <b>Verify that the PowerFlex drive is properly installed.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Drive User Manual                                                                                                                                                     |
| 3    | <b>Install the adapter.</b><br>Verify that the PowerFlex drive is not powered. Then, connect the adapter to the network using an Ethernet cable and to the drive using the Internal Interface cable. Use the captive screws to secure and ground the adapter to the drive.<br><b>NOTE:</b> When installing the adapter in a: <ul style="list-style-type: none"> <li>• DPI External Comms Kit, refer to the <i>20-XCOMM-DC-BASE Installation Instructions</i> (publication 20COMM-IN001) supplied with the kit.</li> <li>• PowerFlex 750-Series drive, refer to the <i>20-750-20COMM Option Card Installation Instructions</i> (publication 750COM-IN001) supplied with the option card.</li> </ul> | <i>PowerFlex 7-Class DPI Network Communication Adapter Installation Instructions</i> (publication 20COMM-IN004) and <a href="#">Chapter 2, Installing the Adapter</a> |
| 4    | <b>Apply power to the adapter.</b><br>A. The adapter receives power from the drive. Verify that the adapter is installed correctly and then apply power to the drive. The status indicators should be green. If they flash red, there is a problem. Refer to <a href="#">Chapter 7, Troubleshooting</a> .<br>B. Configure/verify key drive parameters.                                                                                                                                                                                                                                                                                                                                             | <a href="#">Chapter 2, Installing the Adapter</a>                                                                                                                     |
| 5    | <b>Configure the adapter for your application.</b><br>Set adapter parameters for the following functions as required by your application: <ul style="list-style-type: none"> <li>• IP address, subnet mask, and gateway address</li> <li>• Data rate</li> <li>• I/O configuration</li> <li>• Master-Slave or Peer-to-Peer hierarchy</li> <li>• Fault actions</li> </ul>                                                                                                                                                                                                                                                                                                                            | <a href="#">Chapter 3, Configuring the Adapter</a>                                                                                                                    |
| 6    | <b>Configure the controller to communicate with the adapter.</b><br>Use a controller configuration tool such as RSLogix to configure the master on the EtherNet/IP network to recognize the adapter and drive.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <a href="#">Chapter 4, Configuring the I/O</a>                                                                                                                        |
| 7    | <b>Create a ladder logic program.</b><br>Use a controller configuration tool such as RSLogix to create a ladder logic program that enables you to: <ul style="list-style-type: none"> <li>• Control the adapter and connected drive using I/O.</li> <li>• Monitor or configure the drive using Explicit messages.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                       | <a href="#">Chapter 5, Using the I/O</a><br><a href="#">Chapter 6, Using Explicit Messaging</a>                                                                       |

## Status Indicators

The adapter uses four status indicators to report its operating status. They can be viewed on the adapter or through the drive cover ([Figure 1.2](#)).

**Figure 1.2** Status Indicators (location on drive may vary)



| Item | Name  |
|------|-------|
| ①    | PORT  |
| ②    | MOD   |
| ③    | NET A |
| ④    | NET B |

After installing the adapter and applying power to the drive, refer to [Start-Up Status Indications on page 2-6](#) for possible start-up status indications and their descriptions.

## Installing the Adapter

This chapter provides instructions for installing the adapter in a PowerFlex 7-Class drive. This adapter can also be installed in a DPI External Comms Kit. In this case, refer to [Chapter 9](#) or the separate *20-XCOMM-DC-BASE Installation Instructions* (publication 20COMM-IN001) supplied with the kit.

| Topic                                                        | Page                |
|--------------------------------------------------------------|---------------------|
| <a href="#">Preparing for an Installation</a>                | <a href="#">2-1</a> |
| <a href="#">Setting the Web Pages Switch (Series B only)</a> | <a href="#">2-2</a> |
| <a href="#">Connecting the Adapter to the Drive</a>          | <a href="#">2-3</a> |
| <a href="#">Connecting the Adapter to the Network</a>        | <a href="#">2-6</a> |
| <a href="#">Applying Power</a>                               | <a href="#">2-6</a> |
| <a href="#">Commissioning the Adapter</a>                    | <a href="#">2-8</a> |

### Preparing for an Installation

Before installing the adapter:

- Make sure the Ethernet switch is the correct type. A “managed” switch that supports IGMP snooping is usually recommended. An “unmanaged” switch can be used instead if RSLogix 5000 version 18 (or later) is used and all devices on the network are configured for “unicast” I/O. For more details, see the following documents:
  - *EtherNet/IP Media Planning and Installation Manual* (ODVA publication 148)
  - *EtherNet/IP Network Infrastructure Guidelines* (ODVA publication 35)
  - *EtherNet/IP Performance Application Solutions* (Rockwell publication ENET-AP001)

- Understand IGMP Snooping/Ethernet Switches

The 20-COMM-E adapter is a multicast device. In most situations, an IGMP snooping (managed) switch is required. If more than one or two 20-COMM-E adapters are connected to the switch, a managed switch is required—otherwise the drive may fault on a DPI Port x network loss. The 20-COMM-E Series B adapter (firmware version 4.001 or later), RSLogix 5000 version 18 (or later), and a ControlLogix or CompactLogix controller will support unicast. When all ethernet connections are set up as unicast devices in RSLogix 5000, then an IGMP snooping (managed) switch is not needed.

Much of EtherNet/IP implicit (I/O) messaging uses IP multicast to distribute I/O control data, which is consistent with the CIP producer/consumer model. Historically, most switches have treated multicast packets the same as broadcast packets. That is, all multicast packets are re-transmitted to all ports.

IGMP snooping constrains the flooding of multicast traffic by dynamically configuring switch ports so that multicast traffic is forwarded only to ports associated with a particular IP multicast group.

Switches that support IGMP snooping (managed switches) “learn” which ports have devices that are part of a particular multicast group and only forward the multicast packets to the ports that are part of the multicast group.

Be careful as to what level of support a switch has of IGMP snooping. Some layer 2 switches that support IGMP snooping require a router (which could be a layer 3 switch) to send out IGMP polls to learn what devices are part of the multicast group. Some layer 2 switches can use IGMP snooping without a router sending polls. If your control system is a stand-alone network or is required to continue performing if the router is out of service, make sure the switch you are using supports IGMP snooping without a router being present.

- Refer to [Appendix A](#) for the number of CIP connections supported by the 20-COMM-E adapter.
- Verify that you have all required equipment. Refer to [Required Equipment on page 1-3](#).

## Setting the Web Pages Switch (Series B only)

To use the adapter web pages, the Web Pages Switch (not provided on Series A adapter) must be set to its “Enable Web” position. For information to enable/disable web pages for a Series A adapter, refer to [Setting Web Access Control on page 3-16](#).

**Important:** A new switch setting is recognized only when power is applied to the adapter, or the adapter is reset. If you change a switch setting, cycle power or reset the adapter to apply the change.

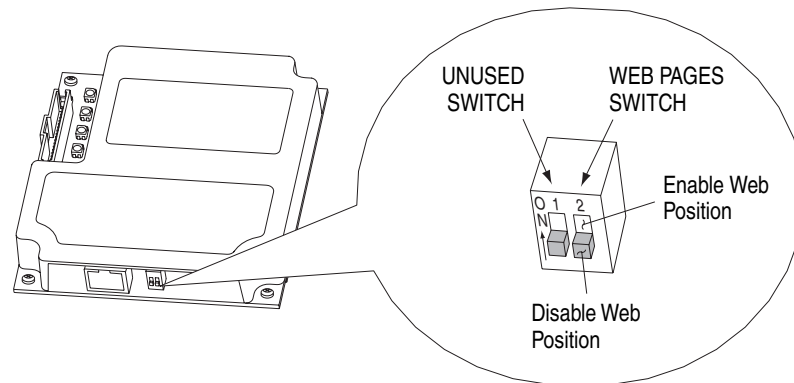


**ATTENTION:** Risk of equipment damage exists. The adapter contains ESD (Electrostatic Discharge) sensitive parts that can be damaged if you do not follow ESD control procedures. Static control precautions are required when handling the adapter. If you are unfamiliar with static control procedures, refer to *Guarding Against Electrostatic Damage* (publication 8000-4.5.2).

---

Set the Web Pages Switch (SW2 in [Figure 2.1](#)) to enable or disable the adapter web pages. By default, the adapter web pages are disabled. For complete details on adapter web pages, see [Viewing the Adapter’s Web Pages on page 8-1](#).

Figure 2.1 Setting Web Pages Switch



| SW2 Setting         | Description                                      |
|---------------------|--------------------------------------------------|
| Down (OFF) position | Disables the adapter web pages (default setting) |
| Up (ON) position    | Enables the adapter web pages                    |

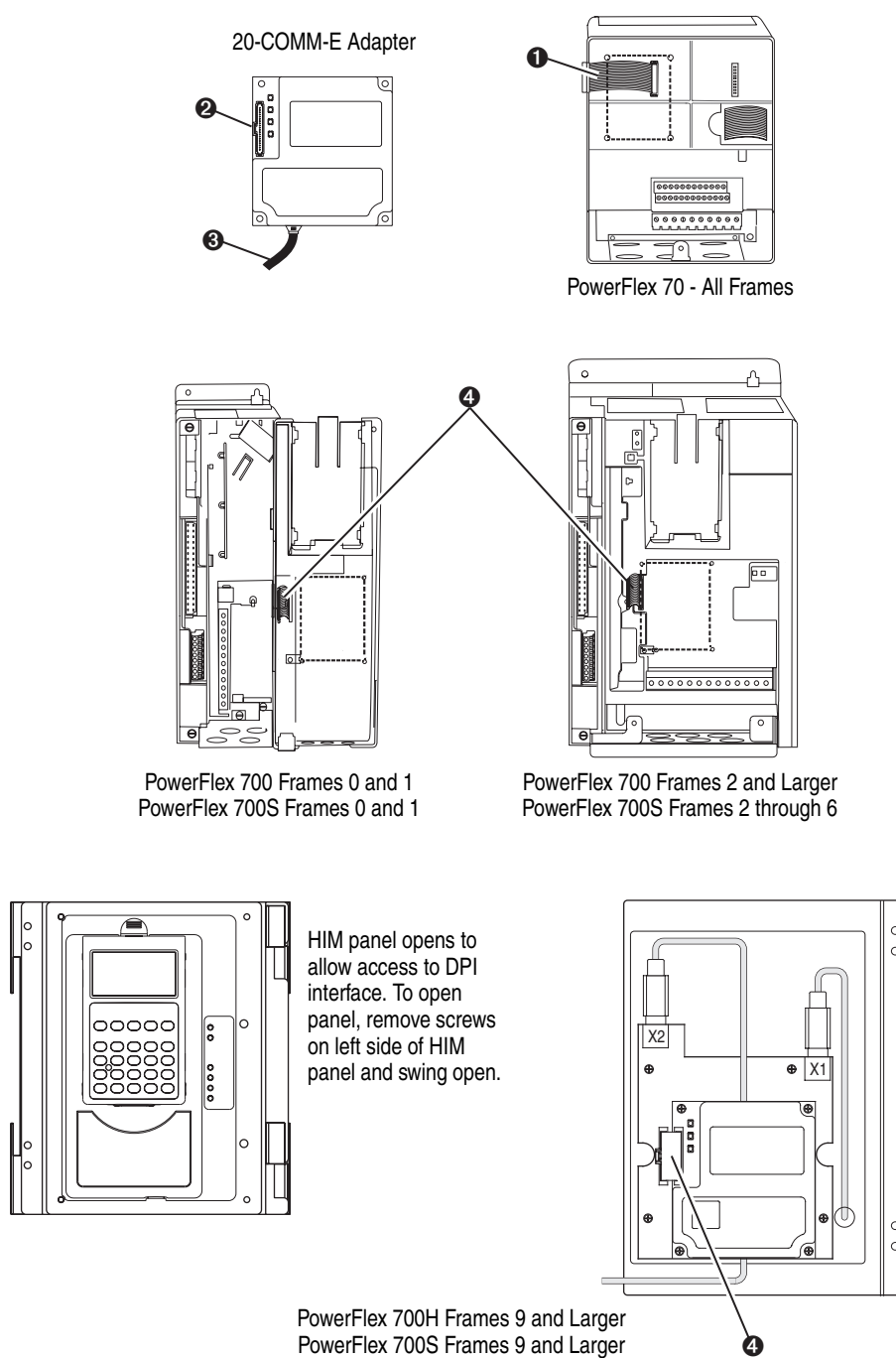
## Connecting the Adapter to the Drive



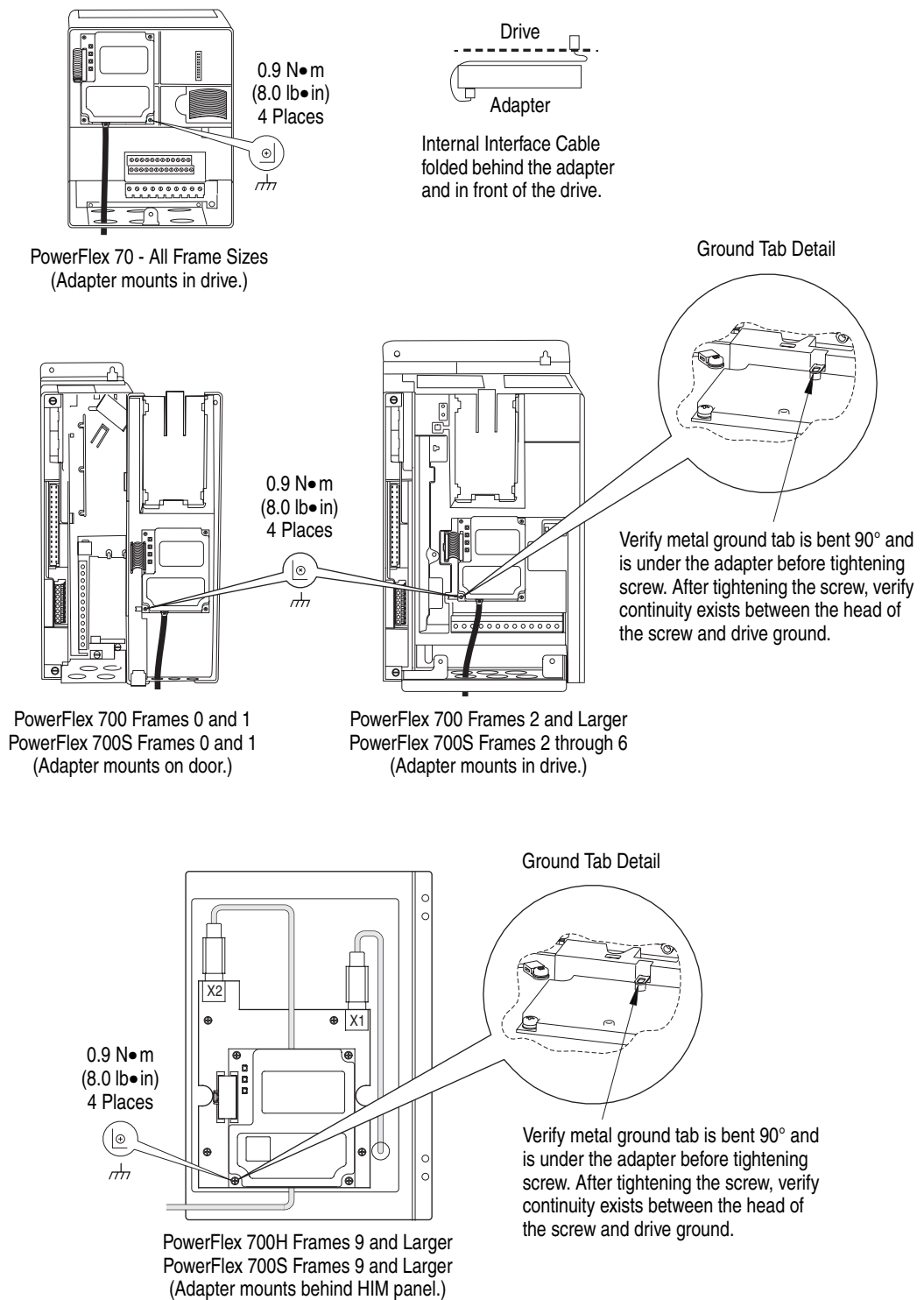
**ATTENTION:** Risk of injury or death exists. The PowerFlex drive may contain high voltages that can cause injury or death. Remove power from the drive, and then verify power has been discharged before installing or removing the adapter.

1. Remove power from the drive.
2. Use static control precautions.
3. Remove the drive cover or open the drive door.
4. Connect the Internal Interface cable to the DPI port on the drive and then to the DPI connector on the adapter (see [Figure 2.2](#)).
5. Secure and ground the adapter to the drive (see [Figure 2.3](#)) by doing the following:
  - On a PowerFlex 70 drive, fold the Internal Interface cable behind the adapter and mount the adapter on the drive using the four captive screws.
  - On a PowerFlex 700, PowerFlex 700H or PowerFlex 700S drive, mount the adapter on the drive using the four captive screws.

**Important:** Tighten all screws to properly ground the adapter. Recommended torque is 0.9 N•m (8.0 lb•in).

**Figure 2.2 DPI Ports and Internal Interface Cables**


| Item | Description                               |
|------|-------------------------------------------|
| ❶    | 15.24 cm (6 in.) Internal Interface cable |
| ❷    | DPI Connector                             |
| ❸    | Ethernet cable                            |
| ❹    | 2.54 cm (1 in.) Internal Interface cable  |

**Figure 2.3 Mounting and Grounding the Adapter**

**NOTE:** When installing the adapter in a PowerFlex 750-Series drive, refer to the *20-750-20COMM Option Card Installation Instructions* (publication 750COM-IN001) supplied with the option card.

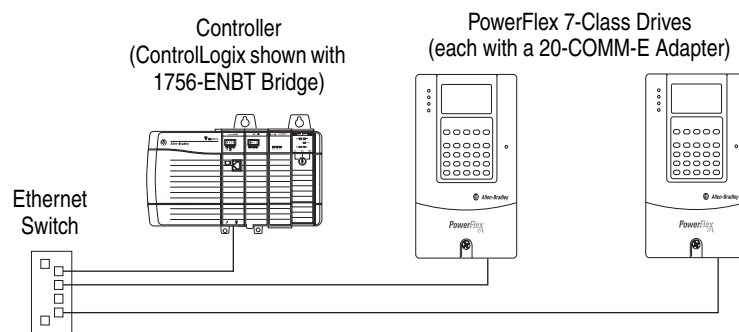
## Connecting the Adapter to the Network



**ATTENTION:** Risk of injury or death exists. The PowerFlex drive may contain high voltages that can cause injury or death. Remove power from the drive, and then verify power has been discharged before installing or removing the adapter.

1. Remove power from the drive.
2. Use static control precautions.
3. Connect one end of an Ethernet cable to the network. See [Figure 2.4](#) for an example of wiring to an EtherNet/IP network.

**Figure 2.4 Connecting the Ethernet Cable to the Network**



4. Route the other end of the Ethernet cable through the bottom of the PowerFlex drive ([Figure 2.3](#)) and insert its Ethernet cable plug into the mating adapter receptacle.

## Applying Power

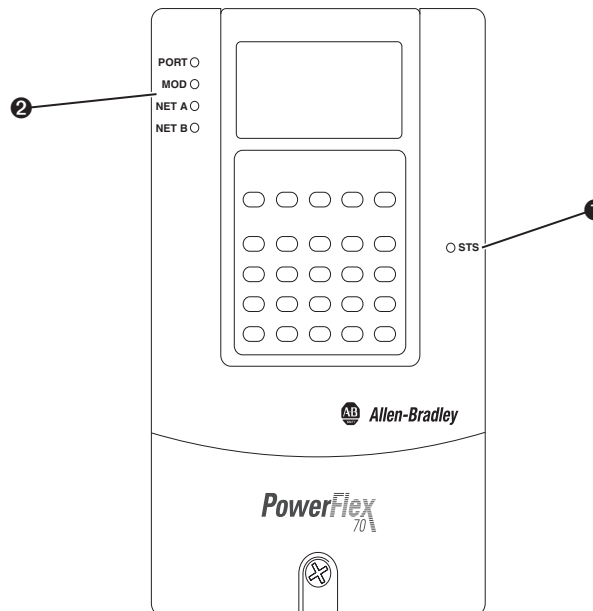


**ATTENTION:** Risk of equipment damage, injury, or death exists. Unpredictable operation may occur if you fail to verify that parameter settings are compatible with your application. Verify that settings are compatible with your application before applying power to the drive.

Install the drive cover or close the drive door, and apply power to the drive. The adapter receives its power from the connected drive. When you apply power to the adapter for the first time, its topmost “PORT” status indicator should be steady green or flashing green after an initialization. If it is red, there is a problem. Refer to [Chapter 7, Troubleshooting](#).

## Start-Up Status Indications

After power has been applied, the status indicators for the drive and communications adapter can be viewed on the front of the drive ([Figure 2.5](#)). Possible start-up status indications are shown in [Table 2.A](#).

**Figure 2.5 Drive and Adapter Status Indicators (location on drive may vary)****Table 2.A Drive and Adapter Start-Up Status Indications**

| Item                      | Name         | Color  | State                   | Description                                                                                                                                                                |
|---------------------------|--------------|--------|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Drive STS Indicator       |              |        |                         |                                                                                                                                                                            |
| ❶                         | STS (Status) | Green  | Flashing                | Drive ready but not running, and no faults are present.                                                                                                                    |
|                           |              |        | Steady                  | Drive running, no faults are present.                                                                                                                                      |
|                           |              | Yellow | Flashing, Drive Stopped | An inhibit condition exists – the drive cannot be started. Check drive Parameter 214 - [Start Inhibits].                                                                   |
|                           |              |        | Flashing, Drive Running | An intermittent type 1 alarm condition is occurring. Check drive Parameter 211 - [Drive Alarm 1].                                                                          |
|                           |              |        | Steady, Drive Running   | A continuous type 1 alarm condition exists. Check drive Parameter 211 - [Drive Alarm 1].                                                                                   |
|                           |              | Red    | Flashing                | A fault has occurred.                                                                                                                                                      |
|                           |              |        | Steady                  | A non-resettable fault has occurred.                                                                                                                                       |
| Adapter Status Indicators |              |        |                         |                                                                                                                                                                            |
| ❷                         | PORT         | Green  | Flashing                | Normal Operation. The adapter is establishing an I/O connection to the drive. It will turn steady green or red.                                                            |
|                           |              |        | Steady                  | Normal Operation. The adapter is properly connected and communicating with the drive.                                                                                      |
|                           | MOD          | Green  | Flashing                | Normal Operation. The adapter is operating but is not transferring I/O data to a controller.                                                                               |
|                           |              |        | Steady                  | Normal Operation. The adapter is operating and transferring I/O data to a controller.                                                                                      |
|                           | NET A        | Green  | Off                     | Normal operation. BOOTP is enabled or a valid IP address is not set.                                                                                                       |
|                           |              |        | Flashing                | Normal Operation. BOOTP is disabled, the adapter is properly connected, has an IP address, and is connected to an EtherNet/IP network but does not have an I/O connection. |
|                           |              |        | Steady                  | Normal Operation. The adapter is properly connected and communicating on the network to a controller.                                                                      |
|                           | NET B        | Green  | Off                     | Normal Operation. The adapter is properly connected but is idle.                                                                                                           |
|                           |              |        | Flashing                | Normal Operation. The adapter is properly connected, BOOTP is enabled, and the adapter is transmitting data packets on the network.                                        |

For more details on status indicator operation, refer to [page 7-2](#) and [page 7-3](#).

## Configuring/Verifying Key Drive Parameters

The PowerFlex 7-Class drive can be separately configured for the control and Reference functions in various combinations. For example, you could set the drive to have its control come from a peripheral or terminal block with the Reference coming from the network. Or you could set the drive to have its control come from the network with the Reference coming from another peripheral or terminal block. Or you could set the drive to have both its control and Reference come from the network.

The following steps in this section assume that the drive will receive the Logic Command and Reference from the network.

1. Use drive Parameter 090 - [Speed Ref A Sel] to set the drive speed Reference to “22” (DPI Port 5).
2. If hard-wired discrete digital inputs are not used to control the drive, verify that unused digital input drive Parameters 361 - [Dig In1 Sel] and 362 - [Dig In2 Sel] are set to “0” (Not Used).
3. Verify that drive Parameter 213 - [Speed Ref Source] is reporting that the source of the Reference to the drive is “22” (DPI Port 5). This ensures that any Reference commanded from the network can be monitored by using drive Parameter 002 - [Commanded Speed]. If a problem occurs, this verification step provides the diagnostic capability to determine whether the drive/adapter or the network is the cause.



**TIP:** For PowerFlex 750-Series drives, use drive Parameter 545 - [Speed Ref A Sel] to set the drive speed Reference:

**A.** Set the Port field to “Port 0 - PowerFlex 75x.”

**B.** Set the Parameter field to point to the port in which the 20-COMM-E adapter/20-750-20COMM Option Card are installed (for example, “876 - Port 6 Reference”).

## Commissioning the Adapter

To commission the adapter, you must set a unique IP address on the network. (Refer to the [Glossary](#) for details about IP addresses.) After installing the adapter and applying power, you can set the IP address by using a BOOTP server or by setting adapter parameters. See [Setting the IP Address, Subnet Mask, and Gateway Address on page 3-6](#) for details.

By default, the adapter is configured so that you must set the IP address using a BOOTP server. To set the IP address using adapter parameters, you must disable the BOOTP feature. See [Disabling the BOOTP Feature on page 3-6](#) for details.

**Important:** New settings for some adapter parameters (for example, **Parameters 04 - [IP Addr Cfg 1] through 07 - [IP Addr Cfg 4]**) are recognized only when power is applied to the adapter or it is reset. After you change parameter settings, cycle power or reset the adapter.

## Configuring the Adapter

This chapter provides instructions and information for setting the parameters in the adapter.

| Topic                                                                    | Page                 |
|--------------------------------------------------------------------------|----------------------|
| <a href="#">Configuration Tools</a>                                      | <a href="#">3-1</a>  |
| <a href="#">Using the PowerFlex 7-Class HIM</a>                          | <a href="#">3-2</a>  |
| <a href="#">Using BOOTP</a>                                              | <a href="#">3-3</a>  |
| <a href="#">Setting the IP Address, Subnet Mask, and Gateway Address</a> | <a href="#">3-6</a>  |
| <a href="#">Setting the Data Rate</a>                                    | <a href="#">3-8</a>  |
| <a href="#">Setting the I/O Configuration</a>                            | <a href="#">3-8</a>  |
| <a href="#">Selecting Master-Slave or Peer-to-Peer</a>                   | <a href="#">3-9</a>  |
| <a href="#">Setting the Reference Adjustment</a>                         | <a href="#">3-14</a> |
| <a href="#">Setting a Fault Action</a>                                   | <a href="#">3-15</a> |
| <a href="#">Setting Web Access Control</a>                               | <a href="#">3-16</a> |
| <a href="#">Resetting the Adapter</a>                                    | <a href="#">3-17</a> |
| <a href="#">Viewing the Adapter Status Using Parameters</a>              | <a href="#">3-18</a> |
| <a href="#">Flash Updating the Adapter</a>                               | <a href="#">3-18</a> |

For a list of parameters, refer to [Appendix B, Adapter Parameters](#). For definitions of terms in this chapter, refer to the [Glossary](#).

### Configuration Tools

The adapter stores parameters and other information in its own non-volatile memory. You must, therefore, access the adapter to view and edit its parameters. The following tools can be used to access the adapter parameters:

| Tool                                            | Refer to...                                                                                                                                              |
|-------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| PowerFlex 7-Class HIM                           | <a href="#">page 3-2</a>                                                                                                                                 |
| BOOTP Server                                    | <a href="#">page 3-3</a>                                                                                                                                 |
| DriveExplorer Software (version 2.01 or later)  | <a href="http://www.ab.com/drives/driveexplorer">http://www.ab.com/drives/driveexplorer</a> , or DriveExplorer online help (installed with the software) |
| DriveExecutive Software (version 3.01 or later) | <a href="http://www.ab.com/drives/drivetools">http://www.ab.com/drives/drivetools</a> , or DriveExecutive online help (installed with the software)      |

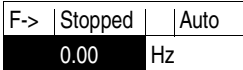
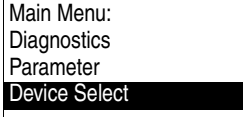
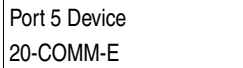
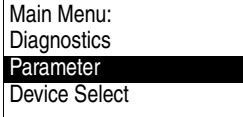
Using the PowerFlex 7-Class HIM

If your drive has either an LED or LCD HIM (Human Interface Module), it can be used to access parameters in the adapter as shown below. It is recommended that you read through the steps for your HIM before performing the sequence. For additional information, refer to the drive documentation or the *PowerFlex 7-Class HIM Quick Reference* (publication 20HIM-QR001).

Using an LED HIM

| Step                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Example Screens                                                                                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| <div>1. Press the <b>ALT</b> key and then the Device <b>Sel</b> (Sel) key to display the Device Screen.</div> <div>2. Press the <b>▲</b> or <b>▼</b> key to scroll to the adapter. Letters represent files in the drive, and numbers represent ports. The adapter is usually connected to port 5.</div> <div>3. Press the <b>↵</b> (Enter) key to enter your selection. A parameter database is constructed, and then the first parameter is displayed.</div> <div>4. Edit the parameters using the same techniques that you use to edit drive parameters.</div> | <div></div> |

Using an LCD HIM

| Step                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Example Screens                                                                                                                                                                                                                                                                                                                                                                                     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <div>1. In the main menu, press the <b>▲</b> or <b>▼</b> key to scroll to <b>Device Select</b>.</div> <div>2. Press the <b>↵</b> (Enter) key to enter your selection.</div> <div>3. Press the <b>▲</b> or <b>▼</b> key to scroll to the adapter (20-COMM-E).</div> <div>4. Press the <b>↵</b> (Enter) key to select the adapter. A parameter database is constructed, and then the main menu for the adapter is displayed.</div> <div>5. Edit the parameters using the same techniques that you use to edit drive parameters.</div> | <div></div> <div></div> <div></div> <div></div> |

**NOTE:** All configuration procedures throughout this chapter use the PowerFlex 7-Class LCD HIM to access parameters in the adapter and show example LCD HIM screens.



**TIP:** When using a PowerFlex 20-HIM-A6 or 20-HIM-C6S HIM, refer to its User Manual, publication 20-HIM-UM001).

## Using BOOTP

By default, the adapter is configured so that you can set its IP address, subnet mask, and gateway address by using a BOOTP utility. You can select from a variety of BOOTP utilities. These instructions use Rockwell's BOOTP Server (version 2.3 or later), a free stand-alone program that incorporates the functionality of standard BOOTP utilities with a graphical interface. It is available from <http://www.software.rockwell.com/support/download/detail.cfm?ID=3390>. Refer to the Readme file and online Help for directions and more information.

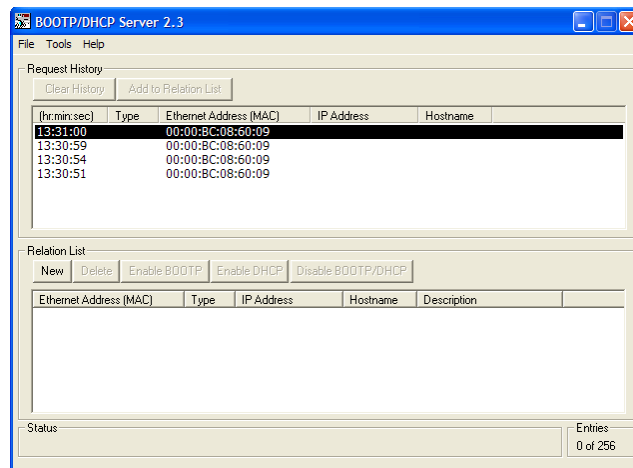


**TIP:** If desired, you can disable BOOTP and configure the IP address, subnet mask, and gateway address by setting parameters. For details, see [Setting the IP Address, Subnet Mask, and Gateway Address on page 3-6](#).

## Configuring the Adapter Using BOOTP Server

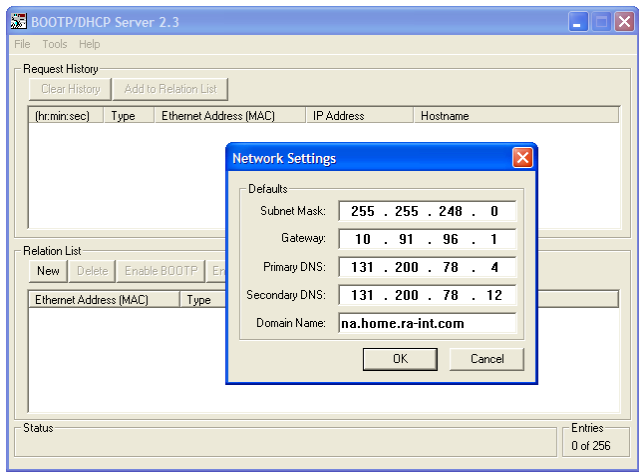
1. On the adapter label, note the adapter's hardware Ethernet Address (MAC), which will be used in Step 6.
2. On a computer connected to the EtherNet/IP network, start the BOOTP software. The BOOTP Server window ([Figure 3.1](#)) appears.

**Figure 3.1** BOOTP Server Window



3. To properly configure devices on your EtherNet/IP network, you must configure settings in the BOOTP software to match the network. Select **Tools > Network Settings** to display the Network Settings window ([Figure 3.2](#)).

**Figure 3.2    Network Settings Window**



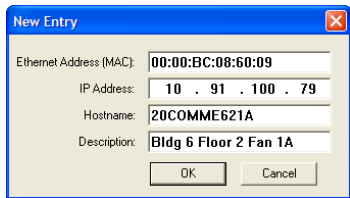
**4. Edit the following:**

| Box                        | Type                                                                                                                                                                       |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Subnet Mask <sup>(1)</sup> | The subnet mask for the adapter's network.                                                                                                                                 |
| Gateway <sup>(1)</sup>     | The IP address of the gateway device on the adapter's network.                                                                                                             |
| Primary DNS                | The address of the primary DNS server to be used on the local end of the link for negotiating with remote devices.                                                         |
| Secondary DNS              | Optional — the address of the secondary DNS server to be used on the local end of the link for negotiating with remote devices when the primary DNS server is unavailable. |
| Domain Name                | The text name corresponding to the numeric IP address that was assigned to the server that controls the network.                                                           |

<sup>(1)</sup> For definitions of these terms, refer to the [Glossary](#).

- 5.** Click **OK** to apply the settings. Devices on the network issuing BOOTP requests appear in the BOOTP Request History list.
- 6.** In the BOOTP Request History list, either double-click the adapter's Ethernet Address (MAC) noted in Step 1, or click **New** in the Relation List. The New Entry dialog box ([Figure 3.3](#)) appears. In the first case, the Ethernet Address (MAC) is automatically entered. In the latter case, you must manually enter it.

**Figure 3.3    New Entry Dialog Box**



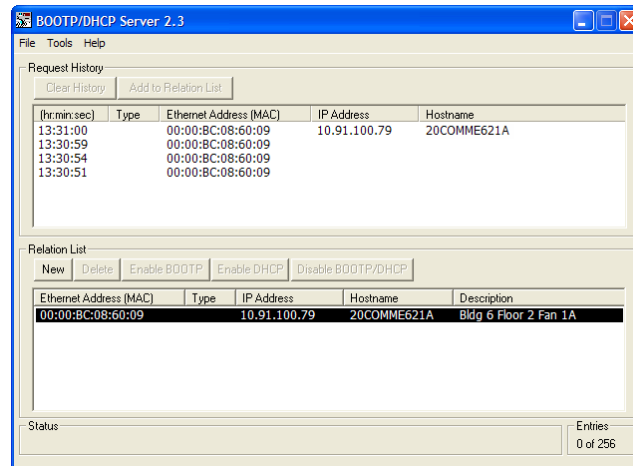
## 7. Edit the following:

| Box                       | Type                                |
|---------------------------|-------------------------------------|
| IP Address <sup>(1)</sup> | A unique IP address for the adapter |
| Host Name                 | Optional                            |
| Description               | Optional                            |

<sup>(1)</sup> For a definition of this term, refer to the [Glossary](#).

8. Click **OK** to apply the settings. The adapter appears in the Relation List ([Figure 3.4](#)) with the new settings.

Figure 3.4 BOOTP Server Window with Adapter in the Relation List

9. To assign this configuration to the adapter permanently, select the device in the Relation List and click **Disable BOOTP/DHCP**. When power is cycled on the adapter, it will use the configuration you assigned it and not issue new BOOTP requests.

**TIP:** To enable BOOTP for an adapter that has had BOOTP disabled, first select the adapter in the Relation List, then click **Enable BOOTP**, and finally reset the adapter or power cycle the drive.

10. To save the Relation List, select **File > Save**.

Setting the IP Address,  
Subnet Mask, and Gateway  
Address

By default, the adapter is configured so that you set its IP address, subnet mask, and gateway address using a BOOTP server. If you want to set these attributes using the adapter parameters instead, you must disable BOOTP and then set the appropriate parameters in the adapter.

Disabling the BOOTP Feature

- 1. Set the value of **Parameter 03 - [BOOTP]** to “0” (Disabled).

Figure 3.5    Example BOOTP LCD HIM Screen

| Port 5 Device<br>20-COMM-E | <table><tr><th>Value</th><th>Setting</th></tr><tr><td>0</td><td>Disabled</td></tr><tr><td>1</td><td>Enabled (Default)</td></tr></table> | Value | Setting | 0 | Disabled | 1 | Enabled (Default) |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|-------|---------|---|----------|---|-------------------|
| Value                      | Setting                                                                                                                                 |       |         |   |          |   |                   |
| 0                          | Disabled                                                                                                                                |       |         |   |          |   |                   |
| 1                          | Enabled (Default)                                                                                                                       |       |         |   |          |   |                   |
| Parameter #: 03<br>BOOTP   |                                                                                                                                         |       |         |   |          |   |                   |
| <div>0</div>               |                                                                                                                                         |       |         |   |          |   |                   |
| Disabled                   |                                                                                                                                         |       |         |   |          |   |                   |

- 2. Reset the adapter (see [Resetting the Adapter on page 3-17](#)).

After disabling the BOOTP feature, you can then configure the IP address, subnet mask, and gateway address using adapter parameters.

Setting an IP Address Using Parameters

- 1. Verify that **Parameter 03 - [BOOTP]** is set to “0” (Disabled). This parameter must be set to Disabled to configure the IP address using the adapter parameters.
- 2. Set the value of **Parameters 04 - [IP Addr Cfg 1]** through **07 - [IP Addr Cfg 4]** to a unique IP address.

Figure 3.6    Example IP Addr Cfg 1 LCD HIM Screen

|                                  |                                            |
|----------------------------------|--------------------------------------------|
| Port 5 Device<br>20-COMM-E       | Default = 0.0.0.0    255 . 255 . 255 . 255 |
| Parameter #: 04<br>IP Addr Cfg 1 | [IP Addr Cfg 1]                            |
| <div>0</div>                     | [IP Addr Cfg 2]                            |
| 0 <> 255                         | [IP Addr Cfg 3]                            |
|                                  | [IP Addr Cfg 4]                            |

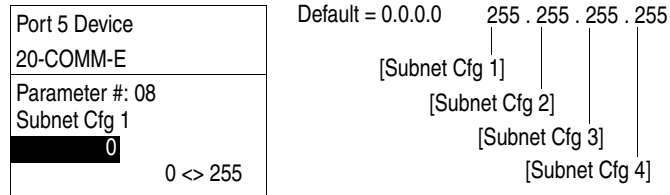
- 3. Reset the adapter (see [Resetting the Adapter on page 3-17](#)).

The NET A status indicator will be steady green or flashing green if the IP address is correctly configured, and is connected to an operating ethernet network.

## Setting a Subnet Mask Using Parameters

1. Verify that **Parameter 03 - [BOOTP]** is set to “0” (Disabled). This parameter must be set to Disabled to configure the subnet mask using the adapter parameters.
2. Set the value of **Parameters 08 - [Subnet Cfg 1]** through **11 - [Subnet Cfg 4]** to the desired value for the subnet mask.

**Figure 3.7 Example Subnet Cfg 1 LCD HIM Screen**

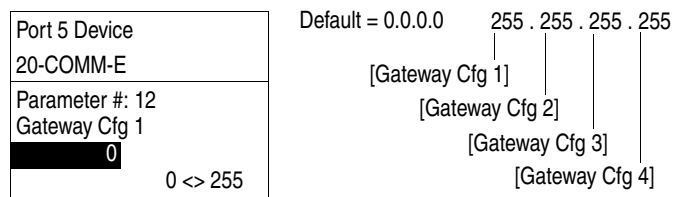


3. Reset the adapter (see [Resetting the Adapter on page 3-17](#)).

## Setting a Gateway Address for the Adapter Using Parameters

1. Verify that **Parameter 03 - [BOOTP]** is set to “0” (Disabled). This parameter must be set to Disabled to configure the gateway address using the adapter parameters.
2. Set the value of **Parameters 12 - [Gateway Cfg 1]** through **15 - [Gateway Cfg 4]** to the IP address of the gateway device.

**Figure 3.8 Example Gateway Cfg 1 LCD HIM Screen**



3. Reset the adapter (see [Resetting the Adapter on page 3-17](#)).

## Setting the Data Rate

By default, the adapter is set to autodetect, so it automatically detects the data rate and duplex setting used on the network. If you need to set a specific data rate and duplex setting, the value of **Parameter 16 - [EN Rate Cfg]** determines the Ethernet data rate and duplex setting that the adapter will use to communicate. For definitions of data rate and duplex, refer to the [Glossary](#).

1. Set the value of **Parameter 16 - [EN Rate Cfg]** to the data rate at which your network is operating.

**Figure 3.9 Example Ethernet Rate Cfg LCD HIM Screen**

|                                     |              |                      |
|-------------------------------------|--------------|----------------------|
| Port 5 Device<br>20-COMM-E          | <b>Value</b> | <b>Data Rate</b>     |
| Parameter #: 16<br>EN Rate Cfg<br>0 | 0            | Autodetect (default) |
| Autodetect                          | 1            | 10 Mbps Full         |
|                                     | 2            | 10 Mbps Half         |
|                                     | 3            | 100 Mbps Full        |
|                                     | 4            | 100 Mbps Half        |

► **TIP:** Auto detection of baud rate and duplex works properly only if the device (usually a switch) on the other end of the cable is also set to auto detect the baud rate/duplex. If one device has the baud rate/duplex hard coded, the other device must be hard-coded to the same settings.

2. Reset the adapter (see [Resetting the Adapter on page 3-17](#)).

## Setting the I/O Configuration

The I/O configuration determines the data that is sent to and from the drive. Logic Command/Status, Reference/Feedback, and Datalinks may be enabled or disabled. (Datalinks allow you to read/write directly to parameters in the drive using implicit I/O.) A “1” enables the I/O and a “0” disables the I/O.

1. Set the bits in **Parameter 23 - [DPI I/O Cfg]**.

**Figure 3.10 Example DPI I/O Cfg LCD HIM Screen**

|                                                                 |            |                                   |
|-----------------------------------------------------------------|------------|-----------------------------------|
| Port 5 Device<br>20-COMM-E                                      | <b>Bit</b> | <b>Description</b>                |
| Parameter #: 23<br>DPI I/O Cfg<br>x x x x x x x x x x 0 0 0 0 1 | 0          | Logic Command/Reference (Default) |
| Cmd/Ref b00                                                     | 1          | Datalink A                        |
|                                                                 | 2          | Datalink B                        |
|                                                                 | 3          | Datalink C                        |
|                                                                 | 4          | Datalink D                        |
|                                                                 | 5...15     | Not Used                          |

Bit 0 is the right-most bit. In [Figure 3.10](#), it is highlighted and equals “1.”

2. If a controller is used to control the drive, adapter **Parameters 35 - [M-S Input]** and **36 - [M-S Output]** for Master-Slave Hierarchy must be set (see [Setting a Master-Slave Hierarchy \(Scanner-to-Drive Communication\) on page 3-9](#)).
3. If Logic Command/Reference is enabled, configure the parameters in the drive to accept the Logic Command and Reference from the adapter.

For example, set Parameter 90 - [Speed Ref A Sel] in a PowerFlex 70 or 700 drive to “22” (DPI Port 5) so that the drive uses the Reference from the adapter. Also, verify that the mask parameters (for example, Parameter 276 - [Logic Mask]) in the drive are configured to receive the desired logic from the adapter. Refer to the documentation for your drive for details.

4. If you enabled one or more Datalinks, configure parameters in the drive to determine the source and destination of data in the Datalink(s). When using Datalinks, up to 8 drive [Data In xx] parameters (300...307) and/or up to 8 [Data Out xx] parameters (310...317) must be assigned to point to the appropriate drive parameters for your application. See [Chapter 4](#) for an example.
5. Reset the adapter (see [Resetting the Adapter on page 3-17](#)).

The adapter is ready to receive I/O. You must now configure the adapter to receive I/O from a master or peer device. See [Selecting Master-Slave or Peer-to-Peer](#). If you select a Master-Slave hierarchy, you must also configure the master to communicate with the adapter. See [Chapter 4, Configuring the I/O](#).

## Selecting Master-Slave or Peer-to-Peer

A hierarchy determines the type of device with which the adapter exchanges data. In a Master-Slave hierarchy, the adapter exchanges data with a master, such as a scanner or bridge (1756-ENBT, 1756-EN2T, 1747-L5-xxx, etc.). In a Peer-to-Peer hierarchy, the adapter exchanges data with one or more EtherNet/IP adapters connected to other drives. (The drives must have compatible Logic Command/Status words.)

For both Master-Slave and Peer-to-Peer hierarchies, the devices exchanging data must be on the same IP subnet. See “IP Addresses” in the [Glossary](#) for information about IP subnets.

## Setting a Master-Slave Hierarchy (Scanner-to-Drive Communication)

1. Enable the desired I/O in **Parameter 23 - [DPI I/O Cfg]**. See [Figure 3.10](#).
2. Set the bits in **Parameter 35 - [M-S Input]**. This parameter determines the data received from the master by the drive. A “1” enables the I/O and a “0” disables the I/O.

**Figure 3.11 Example M-S Input LCD HIM Screen**

|                                  |            |                                   |
|----------------------------------|------------|-----------------------------------|
| Port 5 Device                    | <b>Bit</b> | <b>Description</b>                |
| 20-COMM-E                        | 0          | Logic Command/Reference (Default) |
| Parameter #: 35                  | 1          | Datalink A Input                  |
| M-S Input                        | 2          | Datalink B Input                  |
| x x x x x x x x x 0 0 0 <b>1</b> | 3          | Datalink C Input                  |
| Cmd/Ref b00                      | 4          | Datalink D Input                  |
|                                  | 5...15     | Not Used                          |

Bit 0 is the right-most bit. In [Figure 3.11](#), it is highlighted and equals “1.”

- Set the bits in **Parameter 36 - [M-S Output]**. This parameter determines the data transmitted from the drive to the scanner. A “1” enables the I/O and a “0” disables the I/O.

**Figure 3.12 Example M-S Output LCD HIM Screen**

|                                                                                           |            |                           |
|-------------------------------------------------------------------------------------------|------------|---------------------------|
| Port 5 Device<br>20-COMM-E                                                                | <b>Bit</b> | <b>Description</b>        |
| Parameter #: 36<br>M-S Output<br>x x x x x x x x x 0 0 0 <b>1</b><br>Status/Fdbk      b00 | 0          | Status/Feedback (Default) |
|                                                                                           | 1          | Datalink A Output         |
|                                                                                           | 2          | Datalink B Output         |
|                                                                                           | 3          | Datalink C Output         |
|                                                                                           | 4          | Datalink D Output         |
|                                                                                           | 5...15     | Not Used                  |

Bit 0 is the right-most bit. In [Figure 3.12](#), it is highlighted and equals “1.”

- Reset the adapter (see [Resetting the Adapter on page 3-17](#)).

The adapter is ready to receive I/O from the master (that is, scanner). You must now configure the scanner to recognize and transmit I/O to the adapter. See [Chapter 4, Configuring the I/O](#).

### Setting the Adapter to Transmit Peer-to-Peer Data (Drive-to-Drive Communication)

- Verify that **Parameter 51 - [Peer Out Enable]** is set to “0” (Off). This parameter must be Off while you configure peer output parameters.

**Figure 3.13 Example Peer Out Enable LCD HIM Screen**

|                                                       |              |                |
|-------------------------------------------------------|--------------|----------------|
| Port 5 Device<br>20-COMM-E                            | <b>Value</b> | <b>Setting</b> |
| Parameter #: 51<br>Peer Out Enable<br><b>0</b><br>Off | 0            | Off (Default)  |
|                                                       | 1            | On             |

- Set **Parameter 49 - [Peer A Output]** to select the source of the data to output to the network.

**Figure 3.14 Example Peer A Output LCD HIM Screen**

|                                                         |              |                               |
|---------------------------------------------------------|--------------|-------------------------------|
| Port 5 Device<br>20-COMM-E                              | <b>Value</b> | <b>Description</b>            |
| Parameter #: 49<br>Peer A Output<br><b>1</b><br>Cmd/Ref | 0            | Off (Default)                 |
|                                                         | 1            | Logic Command/Reference       |
|                                                         | 2...5        | Datalink A, B, C, or D Input  |
|                                                         | 6...9        | Datalink A, B, C, or D Output |

3. If desired, set **Parameter 50 - [Peer B Output]** to select an additional source of the data to output to the network.

**Figure 3.15 Example Peer B Output LCD HIM Screen**

|                 |              |                               |
|-----------------|--------------|-------------------------------|
| Port 5 Device   | <b>Value</b> | <b>Description</b>            |
| 20-COMM-E       | 0            | Off (Default)                 |
| Parameter #: 50 | 1            | Logic Command/Reference       |
| Peer B Output   | 2...5        | Datalink A, B, C, or D Input  |
| DL A Input      | 6...9        | Datalink A, B, C, or D Output |

4. Set **Parameters 52 - [Peer Out Time]** and **53 - [Peer Out Skip]** to establish the minimum and maximum intervals between Peer messages. Because the adapter transmits Peer messages when a change-of-state condition occurs, minimum and maximum intervals are required.
  - The minimum interval ensures that the adapter does not transmit messages on the network too often, thus minimizing network traffic. It is set using **Parameter 52 - [Peer Out Time]**.
  - The maximum interval ensures that the adapter transmits messages often enough so that the receiving adapter(s) can receive recent data and verify that communications are working or, if communications are not working, can timeout. The maximum interval is the value of **Parameter 52 - [Peer Out Time]** multiplied by the value of **Parameter 53 - [Peer Out Skip]**.

In the [Figure 3.16](#) example, the minimum interval is set to 2.00 seconds (**Parameter 52 - [Peer Out Time]**), and the maximum interval is set to 4.00 seconds (2.00 x “2” setting of **Parameter 53 - [Peer Out Skip]**).

**Figure 3.16 Example Peer Out Time and Peer Out Skip LCD HIM Screens**

|                 |                 |
|-----------------|-----------------|
| Port 5 Device   | Port 5 Device   |
| 20-COMM-E       | 20-COMM-E       |
| Parameter #: 52 | Parameter #: 53 |
| Peer Out Time   | Peer Out Skip   |
| 2.00 s          | 2               |
| 0 <> 10.00      | 1 <> 16         |

Default = 10.00 s                      Default = 1

5. Set **Parameter 51 - [Peer Out Enable]** to “1” (On). The adapter will transmit the data selected in **Parameters 49 - [Peer A Output]** and **50 - [Peer B Output]** to the network. Another adapter must be configured to receive the Peer I/O data.

## Setting the Adapter to Receive Peer-to-Peer Data

1. Verify that **Parameter 47 - [Peer Inp Enable]** is set to “0” (Off). This parameter must be Off while you configure the peer input parameters.

**Figure 3.17 Example Peer Inp Enable LCD HIM Screen**

|                                    |              |                |
|------------------------------------|--------------|----------------|
| Port 5 Device<br>20-COMM-E         | <b>Value</b> | <b>Setting</b> |
| Parameter #: 47<br>Peer Inp Enable | 0            | Off (Default)  |
| Off                                | 1            | On             |

2. Set **Parameters 42 - [Peer Inp Addr 1]** through **45 - [Peer Inp Addr 4]** to the IP address of the node from which you want to receive data. Valid nodes must have 20-COMM-E adapters connected to drives with compatible Logic Command/Status words.

**Figure 3.18 Example Peer Inp Addr 1 LCD HIM Screen**

|                                    |                                             |  |  |  |
|------------------------------------|---------------------------------------------|--|--|--|
| Port 5 Device<br>20-COMM-E         | IP Address of Node<br>Transmitting Peer I/O |  |  |  |
| Parameter #: 42<br>Peer Inp Addr 1 | 255 . 255 . 255 . 255                       |  |  |  |
| 0                                  | [Peer Inp Addr 1]                           |  |  |  |
| 0 <> 255                           | [Peer Inp Addr 2]                           |  |  |  |
|                                    | [Peer Inp Addr 3]                           |  |  |  |
|                                    | [Peer Inp Addr 4]                           |  |  |  |
|                                    | Default = 0.0.0.0                           |  |  |  |

3. Set **Parameter 38 - [Peer A Input]** to select the destination of the data that is input to the drive as Peer A.

**Figure 3.19 Example Peer A Input LCD HIM Screen**

|                                 |              |                              |
|---------------------------------|--------------|------------------------------|
| Port 5 Device<br>20-COMM-E      | <b>Value</b> | <b>Description</b>           |
| Parameter #: 38<br>Peer A Input | 0            | Off (Default)                |
| 1                               | 1            | Logic Command/Reference      |
| Cmd/Ref                         | 2...5        | Datalink A, B, C, or D Input |

With the Series A adapter, if you select a Reference or Datalink as an input, note the following:

- If a drive that uses a 32-bit Reference and 32-bit Datalinks receives a 16-bit Reference or Datalink, it uses the data in its most significant word, and its least significant word is zero.
- If a drive that uses a 16-bit Reference and 16-bit Datalinks receives a 32-bit Reference or Datalink, it uses the data in the most significant word of the 32-bit Reference or Datalink and ignores the data in the least significant word.

With the Series B adapter, data is used from the least significant word in the event of a mismatch in Reference or Datalink sizes.

4. If desired, set **Parameter 39 - [Peer B Input]** to select the destination of the data to input to the drive as Peer B.

**Figure 3.20 Example Peer B Input LCD HIM Screen**

|                                 |              |                              |
|---------------------------------|--------------|------------------------------|
| Port 5 Device<br>20-COMM-E      | <b>Value</b> | <b>Description</b>           |
| Parameter #: 39<br>Peer B Input | 0            | Off (Default)                |
| DL A Input                      | 1            | Logic Command/Reference      |
|                                 | 2...5        | Datalink A, B, C, or D Input |

5. If the adapter receives a Logic Command, set the bits in **Parameter 40 - [Peer Cmd Mask]** that the drive should use. The bit definitions for the Logic Command word will depend on the drive to which the adapter is connected. Refer to [Appendix D](#) or drive documentation.

**Figure 3.21 Example Peer Cmd Mask LCD HIM Screen**

|                                     |              |                                    |
|-------------------------------------|--------------|------------------------------------|
| Port 5 Device<br>20-COMM-E          | <b>Value</b> | <b>Description</b>                 |
| Parameter #: 40<br>Peer Cmd Mask    | 0            | Ignore this command bit. (Default) |
| 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 1            | Use this command bit.              |
| Bit 0                               |              | B00                                |

If the adapter receives a Logic Command from both a Master device and a Peer device, each command bit must have only one source. The source of command bits set to “0” will be the Master device. The source of command bits set to “1” will be the Peer device.

6. Reset the adapter (see [Resetting the Adapter on page 3-17](#)) so that changes to **Parameter 40 - [Peer Cmd Mask]** take effect.
7. Set **Parameter 46 - [Peer Inp Timeout]** to the maximum amount of time the adapter will wait for a message before timing out.

**Important:** This value must be greater than the product of **Parameter 52 - [Peer Out Time]** multiplied by **Parameter 53 - [Peer Out Skip]** in the adapter from which you are receiving I/O.

For example, if the value of **Parameter 52 - [Peer Out Time]** is 2.00 seconds and the value of **Parameter 53 - [Peer Out Skip]** is 2 (see [Figure 3.16](#)), then **Parameter 46 - [Peer Inp Timeout]** needs to have a value greater than 4.00, such as 5.00 (see [Figure 3.22](#)).

**Figure 3.22 Example Peer Inp Timeout LCD HIM Screen**

|                                     |                   |
|-------------------------------------|-------------------|
| Port 5 Device<br>20-COMM-E          | Default = 10.00 s |
| Parameter #: 46<br>Peer Inp Timeout |                   |
| 5.00 s                              |                   |
| 0.01 <> 10.00                       |                   |

8. Set **Parameter 41 - [Peer Flt Action]** to the action that the adapter will take if it times out.



**ATTENTION:** Risk of injury or equipment damage exists. **Parameter 41 - [Peer Flt Action]** lets you determine the action of the adapter and connected drive if peer communications are disrupted. By default, this parameter faults the drive. You can set this parameter so that the drive continues to run. Precautions should be taken to ensure that the setting of this parameter does not create a hazard of injury or equipment damage. When commissioning the drive, verify that your system responds correctly to various situations (for example, a disconnected cable).

Figure 3.23 Example Peer Flt Action LCD HIM Screen

| Port 5 Device<br>20-COMM-E<br>Parameter #: 41<br>Peer Flt Action<br>0<br>Fault | <table><tr><th>Value</th><th>Description</th></tr><tr><td>0</td><td>Fault (Default)</td></tr><tr><td>1</td><td>Stop</td></tr><tr><td>2</td><td>Zero Data</td></tr><tr><td>3</td><td>Hold Last</td></tr><tr><td>4</td><td>Send Flt Cfg</td></tr></table> | Value | Description | 0 | Fault (Default) | 1 | Stop | 2 | Zero Data | 3 | Hold Last | 4 | Send Flt Cfg |
|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------------|---|-----------------|---|------|---|-----------|---|-----------|---|--------------|
| Value                                                                          | Description                                                                                                                                                                                                                                             |       |             |   |                 |   |      |   |           |   |           |   |              |
| 0                                                                              | Fault (Default)                                                                                                                                                                                                                                         |       |             |   |                 |   |      |   |           |   |           |   |              |
| 1                                                                              | Stop                                                                                                                                                                                                                                                    |       |             |   |                 |   |      |   |           |   |           |   |              |
| 2                                                                              | Zero Data                                                                                                                                                                                                                                               |       |             |   |                 |   |      |   |           |   |           |   |              |
| 3                                                                              | Hold Last                                                                                                                                                                                                                                               |       |             |   |                 |   |      |   |           |   |           |   |              |
| 4                                                                              | Send Flt Cfg                                                                                                                                                                                                                                            |       |             |   |                 |   |      |   |           |   |           |   |              |

For more details, see [Setting a Fault Action on page 3-15](#).

9. Set **Parameter 47 - [Peer Inp Enable]** to “1” (On).

The adapter is now configured to receive Peer I/O from the specified node. Ensure that the specified node is configured to transmit Peer I/O.

## Setting the Reference Adjustment

A Reference Adjustment is a percent scaling factor for the Reference from the network. It can be set from 0.00 to 200.00% to allow the drive’s Reference to either match the network Reference (= 100.00%), scale below the network Reference (< 100.00%), or scale above the network Reference (> 100.00%).



**ATTENTION:** To guard against equipment damage and/or personal injury, note that changes to adapter **Parameter 37 - [Ref Adjust]** take effect immediately. A drive receiving its Reference from the adapter will receive the newly scaled Reference, resulting in a change of speed.

If the adapter is receiving a Reference, set **Parameter 37 - [Ref Adjust]** to the desired scaling factor.

Figure 3.24 Example Ref Adjust LCD HIM Screen

|                                                                                           |                   |
|-------------------------------------------------------------------------------------------|-------------------|
| Port 5 Device<br>20-COMM-E<br>Parameter #: 37<br>Ref Adjust<br>100.00 %<br>0.00 <> 200.00 | Default = 100.00% |
|-------------------------------------------------------------------------------------------|-------------------|

The adjustment takes effect as soon as it is entered.

## Setting a Fault Action

By default, when I/O communications are disrupted (for example, a cable is disconnected) or the controller is idle (in program mode or faulted), the drive responds by faulting if it is using I/O from the network. You can configure a different response to:

- Disrupted I/O communication using **Parameter 21 - [Comm Flt Action]**
- An idle controller using **Parameter 22 - [Idle Flt Action]**



**ATTENTION:** Risk of injury or equipment damage exists. **Parameters 21 - [Comm Flt Action]** and **22 - [Idle Flt Action]** let you determine the action of the adapter and connected drive if I/O communications are disrupted or the controller is idle. By default, these parameters fault the drive. You can set these parameters so that the drive continues to run. Precautions should be taken to ensure that the settings of these parameters do not create a risk of injury or equipment damage. When commissioning the drive, verify that your system responds correctly to various situations (for example, a disconnected cable or faulted controller).

## Changing the Fault Action

Set the values of **Parameters 21 - [Comm Flt Action]** and **22 - [Idle Flt Action]** to the desired responses:

| Value | Action       | Description                                                                                                                                                   |
|-------|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0     | Fault        | The drive is faulted and stopped. (Default)                                                                                                                   |
| 1     | Stop         | The drive is stopped, but not faulted.                                                                                                                        |
| 2     | Zero Data    | The drive is sent 0 for output data. This does not command a stop.                                                                                            |
| 3     | Hold Last    | The drive continues in its present state.                                                                                                                     |
| 4     | Send Flt Cfg | The drive is sent the data that you set in the fault configuration parameters ( <b>Parameters 25 - [Flt Cfg Logic]</b> through <b>34 - [Flt Cfg D2 In]</b> ). |

**Figure 3.25 Example Fault Action LCD HIM Screens**

|                                                                                |                                                                                |
|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| Port 5 Device<br>20-COMM-E<br>Parameter #: 21<br>Comm Flt Action<br>0<br>Fault | Port 5 Device<br>20-COMM-E<br>Parameter #: 22<br>Idle Flt Action<br>0<br>Fault |
|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------|

Changes to these parameters take effect immediately. A reset is not required.

If communication is disrupted and then is re-established, the drive will automatically take commands from the network again.

Setting the Fault Configuration Parameters

If you set **Parameter 21 - [Comm Flt Action]** or **22 - [Idle Flt Action]** to “Send Flt Cfg,” the values in the following parameters are sent to the drive after an I/O communications fault and/or idle fault occurs. You must set these parameters to values required by your application.

| Parameter                                               | Description                                                                                                                                                       |
|---------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 25 - [Flt Cfg Logic]                                    | A 16-bit value sent to the drive for Logic Command.                                                                                                               |
| 26 - [Flt Cfg Ref]                                      | A 32-bit value (0...4294967295) sent to the drive as a Reference or Datalink.                                                                                     |
| 27 - [Flt Cfg x1 In]<br>through<br>34 - [Flt Cfg x2 In] | <b>Important:</b> If the drive uses a 16-bit Reference or 16-bit Datalinks, the most significant word of the value must be set to zero (0) or a fault will occur. |

Changes to these parameters take effect immediately. A reset is not required.

Setting Web Access Control

By using a web browser to access the IP address set for the adapter, you can view the adapter’s web pages for information about the adapter, its connected drive, and other DPI devices connected to the drive, such as HIMs or converters. Additionally, the adapter can be configured to automatically send e-mail messages to desired addresses when selected drive faults occur and/or are cleared, and/or when the adapter takes a communication or idle fault action. For more details on the adapter’s web pages, refer to [Chapter 8, Viewing the Adapter’s Web Pages](#).



**TIP:** Series A adapter web pages are accessed differently than Series B web pages. Enabling/disabling e-mail configuration is also different.

Series A Adapter (firmware version 2.002 or earlier)

By default, the Series A adapter web pages are enabled. To disable the adapter web pages, use **Parameter 54 - [Access Control]** to set the Web Enable Bit 0 value to “0” (Disabled). To protect the configured settings for adapter e-mail messaging, use **Parameter 54 - [Access Control]** to set the E-mail Config Bit 1 value to “0” (Disabled). E-mail messaging will remain active regardless of whether or not its settings are protected — unless e-mail messaging was *never* configured. For more information about configuring adapter e-mail messaging, see [Configure E-mail Notification Web Page on page 8-6](#)).

Figure 3.26 Example Web Access Control LCD HIM Screen

| Port 5 Device<br>20-COMM-E<br>Parameter #: 54<br>Access Control<br>x x x x x x x x x x x x x x 0 1<br>Web Enable            b00 | <table><tr><th>Bit</th><th>Description</th></tr><tr><td>0</td><td>Web Enable (Default = 1 = Enabled)</td></tr><tr><td>1</td><td>E-mail Config (Default = 0 = Disabled)</td></tr><tr><td>2...31</td><td>Not Used</td></tr></table> | Bit | Description | 0 | Web Enable (Default = 1 = Enabled) | 1 | E-mail Config (Default = 0 = Disabled) | 2...31 | Not Used |
|---------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-------------|---|------------------------------------|---|----------------------------------------|--------|----------|
| Bit                                                                                                                             | Description                                                                                                                                                                                                                       |     |             |   |                                    |   |                                        |        |          |
| 0                                                                                                                               | Web Enable (Default = 1 = Enabled)                                                                                                                                                                                                |     |             |   |                                    |   |                                        |        |          |
| 1                                                                                                                               | E-mail Config (Default = 0 = Disabled)                                                                                                                                                                                            |     |             |   |                                    |   |                                        |        |          |
| 2...31                                                                                                                          | Not Used                                                                                                                                                                                                                          |     |             |   |                                    |   |                                        |        |          |

Bit 0 is the right-most bit. In [Figure 3.26](#) it is highlighted and equals “1.” Changes to this parameter take effect immediately. A reset is not required.

## Series B Adapter (firmware version 3.xxx or later)

By default, the Series B adapter web pages are disabled. See [Figure 2.1](#) and set the Web Pages Switch (SW2) to the “Enable Web” (up) position.

**Important:** For a change to the switch setting to take effect, the adapter must be reset (see [Resetting the Adapter on page 3-17](#)).

Bit 0 of **Parameter 56 - [Web Features]** is used to protect the configured settings for e-mail messaging. By default, settings are not protected and the user can make changes. To protect the configured settings, set the value of E-mail Cfg Bit 0 to “0” (Disabled). You can unprotect the configuration by changing Bit 0 back to “1” (Enabled). E-mail messaging will always remain active regardless of whether or not its settings are protected — unless e-mail messaging was *never* configured. For more information about configuring adapter e-mail messaging or to stop e-mail messages, see [Configure E-mail Notification Web Page on page 8-6](#).

**Figure 3.27 Example Web Features LCD HIM Screen**

|                                                               |            |                                    |
|---------------------------------------------------------------|------------|------------------------------------|
| Port 5 Device<br>20-COMM-E                                    | <b>Bit</b> | <b>Description</b>                 |
| Parameter #: 56<br>Web Features<br>XXXXXXXXXXXXXXXXX <b>1</b> | 0          | E-mail Cfg (Default = 1 = Enabled) |
| E-mail Cfg           b00                                      | 1...7      | Not Used                           |

Bit 0 is the right-most bit. In [Figure 3.27](#) it is highlighted and equals “1.”

Changes to this parameter take effect immediately. A reset is not required.

## Resetting the Adapter

Changes to switch settings and some adapter parameters require that you reset the adapter before the new settings take effect. You can reset the adapter by power cycling the drive or by using **Parameter 20 - [Reset Module]**.



**ATTENTION:** Risk of injury or equipment damage exists. If the adapter is transmitting control I/O to the drive, the drive may fault when you reset the adapter. Determine how your drive will respond before resetting a connected adapter.

Set **Parameter 20 - [Reset Module]** to “1” (Reset Module).

**Figure 3.28 Example Reset Module LCD HIM Screen**

|                                             |              |                    |
|---------------------------------------------|--------------|--------------------|
| Port 5 Device<br>20-COMM-E                  | <b>Value</b> | <b>Description</b> |
| Parameter #: 20<br>Reset Module<br><b>1</b> | 0            | Ready (Default)    |
| Reset Module                                | 1            | Reset Module       |
|                                             | 2            | Set Defaults       |

When you enter “1” (Reset Module), the adapter will be immediately reset. When you enter “2” (Set Defaults), the adapter will set all adapter

parameters to their factory-default values. After performing a Set Defaults, enter “1” (Reset Module) so that the new values take effect. The value of this parameter will be restored to “0” (Ready) after the adapter is reset.

## Viewing the Adapter Status Using Parameters

The following parameters provide information about the status of the adapter. You can view these parameters at any time.

| Parameter              | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                |          |            |            |            |            |            |                  |         |  |         |   |   |   |   |   |   |   |   |                  |     |   |   |   |   |   |   |   |   |                 |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------|------------|------------|------------|------------|------------|------------------|---------|--|---------|---|---|---|---|---|---|---|---|------------------|-----|---|---|---|---|---|---|---|---|-----------------|
| 17 - [EN Rate Act]     | The data rate used by the adapter.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                |          |            |            |            |            |            |                  |         |  |         |   |   |   |   |   |   |   |   |                  |     |   |   |   |   |   |   |   |   |                 |
| 18 - [Ref/Fdbk Size]   | The size of the Reference/Feedback. It will either be 16 bits or 32 bits. It is set in the drive and the adapter automatically uses the correct size.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                |          |            |            |            |            |            |                  |         |  |         |   |   |   |   |   |   |   |   |                  |     |   |   |   |   |   |   |   |   |                 |
| 19 - [Datalink Size]   | The size of the Datalinks. It will either be 16 bits or 32 bits. It is set in the drive and the adapter automatically uses the correct size.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                |          |            |            |            |            |            |                  |         |  |         |   |   |   |   |   |   |   |   |                  |     |   |   |   |   |   |   |   |   |                 |
| 24 - [DPI I/O Act]     | <div>The Reference/Feedback and Datalinks used by the adapter. This value is the same as <b>Parameter 23 - [DPI I/O Cfg]</b> unless the parameter was changed and the adapter was not reset.</div> <table><tr><th>Bit Definition</th><th>Not Used</th><th>Not Used</th><th>Not Used</th><th>Datalink D</th><th>Datalink C</th><th>Datalink B</th><th>Datalink A</th><th>Cmd/Ref</th><th></th></tr><tr><td>Default</td><td>x</td><td>x</td><td>x</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>0 = I/O disabled</td></tr><tr><td>Bit</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td><td>1 = I/O enabled</td></tr></table> | Bit Definition | Not Used | Not Used   | Not Used   | Datalink D | Datalink C | Datalink B | Datalink A       | Cmd/Ref |  | Default | x | x | x | 0 | 0 | 0 | 0 | 1 | 0 = I/O disabled | Bit | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 1 = I/O enabled |
| Bit Definition         | Not Used                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Not Used       | Not Used | Datalink D | Datalink C | Datalink B | Datalink A | Cmd/Ref    |                  |         |  |         |   |   |   |   |   |   |   |   |                  |     |   |   |   |   |   |   |   |   |                 |
| Default                | x                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | x              | x        | 0          | 0          | 0          | 0          | 1          | 0 = I/O disabled |         |  |         |   |   |   |   |   |   |   |   |                  |     |   |   |   |   |   |   |   |   |                 |
| Bit                    | 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 6              | 5        | 4          | 3          | 2          | 1          | 0          | 1 = I/O enabled  |         |  |         |   |   |   |   |   |   |   |   |                  |     |   |   |   |   |   |   |   |   |                 |
| 48 - [Peer Inp Status] | <div>The status of the consumed peer input connection:</div> <div><u>Values</u><br/>0 = Off<br/>1 = Waiting<br/>2 = Running<br/>3 = Faulted</div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                |          |            |            |            |            |            |                  |         |  |         |   |   |   |   |   |   |   |   |                  |     |   |   |   |   |   |   |   |   |                 |

## Flash Updating the Adapter

The adapter can be flash updated over the network or serially through a direct connection from a computer to the drive using a 1203-USB or 1203-SSS serial converter.

When flashing over the network, you can use the Allen-Bradley software tool ControlFLASH, the built-in flash capability of DriveExplorer Lite or Full, or the built-in flash capability of DriveExecutive.

When flashing through a direct serial connection from a computer to a drive, you can use the same Allen-Bradley software tools described above, or you can use HyperTerminal set to the X-modem protocol.

To obtain a flash update for this adapter, go to <http://www.ab.com/support/abdrives/webupdate>. This site contains all firmware update files and associated Release Notes that describe firmware update enhancements/anomalies, how to determine the existing firmware version, and how to flash update using DriveExplorer, DriveExecutive, ControlFLASH or HyperTerminal.

## Configuring the I/O

This chapter provides instructions on how to configure a Rockwell Automation ControlLogix, PLC-5, SLC 500 or MicroLogix 1100/1400 controller to communicate with the adapter and connected PowerFlex drive.

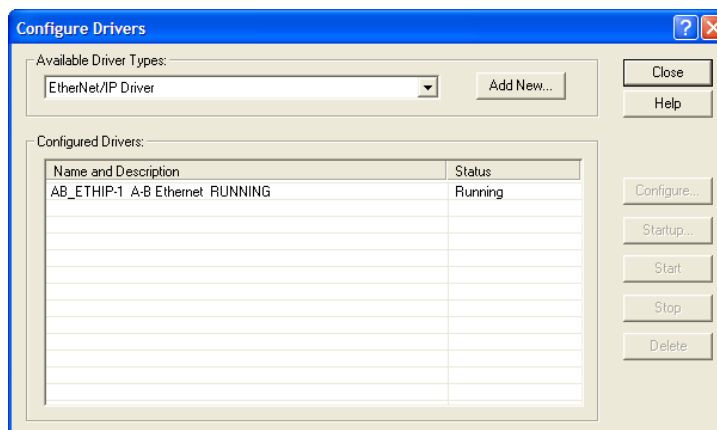
| Topic                                                                         | Page                 |
|-------------------------------------------------------------------------------|----------------------|
| <a href="#">Using RSLinx Classic</a>                                          | <a href="#">4-1</a>  |
| <a href="#">ControlLogix Example</a>                                          | <a href="#">4-2</a>  |
| <a href="#">Limitations When Using PLC-5, SLC 500 or MicroLogix 1100/1400</a> | <a href="#">4-21</a> |
| <a href="#">PLC-5 Example</a>                                                 | <a href="#">4-22</a> |
| <a href="#">SLC 500 Example</a>                                               | <a href="#">4-30</a> |
| <a href="#">MicroLogix 1100/1400 Example</a>                                  | <a href="#">4-38</a> |

### Using RSLinx Classic

RSLinx Classic, in all its variations (Lite, Gateway, OEM, etc.), is used to provide a communication link between the computer, network, and controller. RSLinx Classic requires its network-specific driver to be configured before communications are established with network devices. To configure the RSLinx driver:

1. Start RSLinx and select **Communications > Configure Drivers** to display the Configure Drivers screen.
2. From the Available Driver Types pull-down box, choose “EtherNet/IP Driver” and then click **Add New...** to display the Add New RSLinx Driver screen.
3. Use the default name or type a new name and click **OK**. The “Configure driver:” screen appears.
4. Depending on your application, select either the browse local or remote subnet option, and click **OK**. The Configure Drivers screen reappears with the new driver in the Configured Drivers list ([Figure 4.1](#)).

**Figure 4.1** Configure Drivers Screen with a Configured Driver



5. Click **Close** to close the Configure Drivers screen. Keep RSLinx running.
6. Verify that your computer recognizes the drive. Select **Communications > RSWho** and, in the menu tree, click the “+” symbol next to the Ethernet driver.

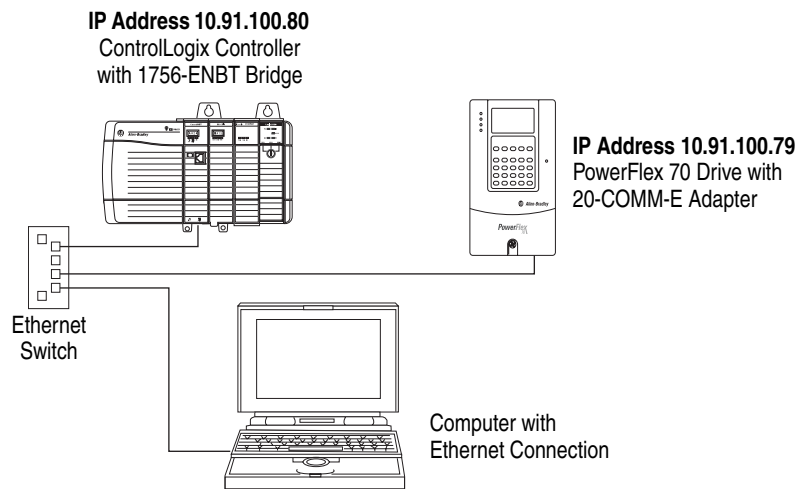
Note that two other RSLinx drivers (Ethernet devices or Remote Devices via Linx Gateway) may be used. Use one of these drivers if the “EtherNet/IP driver” cannot see your drive.

## ControlLogix Example

### Example Network

After the adapter is configured, the connected drive and adapter will be a single node on the network. This section provides the steps needed to configure a simple EtherNet/IP network (see [Figure 4.2](#)). In our example, we will configure a ControlLogix controller with 1756-ENBT (Series A) bridge to communicate with a drive using Logic Command/Status, Reference/Feedback, and 16 Datalinks (8 to read and 8 to write) over the network.

**Figure 4.2** Example ControlLogix EtherNet/IP Network



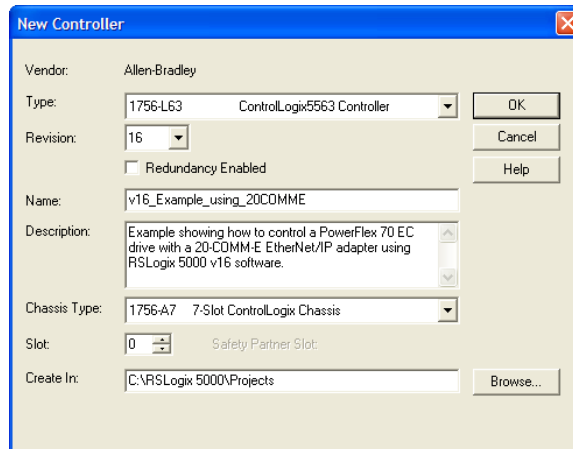
**NOTE:** Information for PowerFlex 750-Series drives has been added to this manual where applicable.

## Adding the Bridge to the I/O Configuration

To establish communications between the controller and adapter over the network, you must first add the ControlLogix controller and its bridge to the I/O configuration. This procedure is similar for all RSLogix 5000 versions.

1. Start RSLogix 5000. The RSLogix 5000 window appears. Select **File > New** to display the New Controller screen (Figure 4.3).

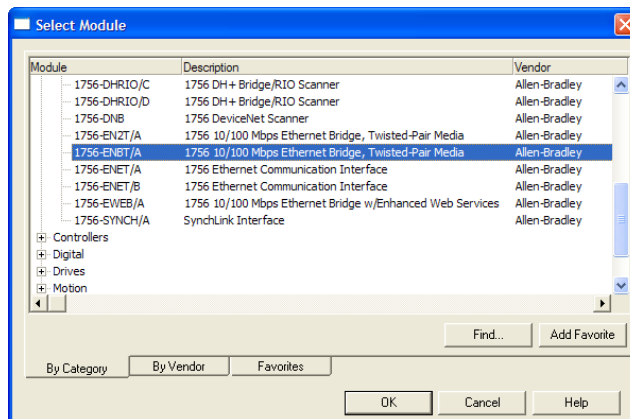
**Figure 4.3 New Controller Screen (RSLogix 5000 v16 shown)**



Select the appropriate choices for the fields in the screen to match your application. Then click **OK**. The RSLogix 5000 window reappears with the treeview in the left pane.

2. In the treeview, right-click the I/O Configuration folder and select **New Module...** The Select Module screen appears. Expand the Communications group to display all of the available communication modules (Figure 4.4).

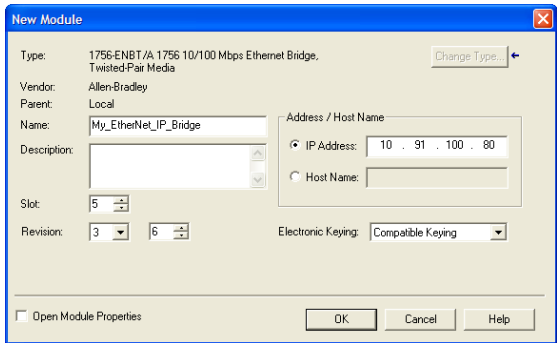
**Figure 4.4 Bridge Select Module Screen**



3. In the list, select the EtherNet/IP bridge used by your controller. In this example, we use a 1756-ENBT EtherNet/IP Bridge (Series A), so the 1756-ENBT/A option is selected. Then click **OK**. In the Select Major Revision pop-up dialog box, select the major revision of its firmware.

4. Click **OK**. The bridge's New Module screen (Figure 4.5) appears.

**Figure 4.5    Bridge New Module Screen**

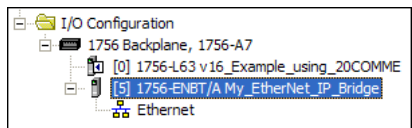


5. Edit the following:

| Box                    | Setting                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Name                   | A name to identify the EtherNet/IP bridge.                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Description            | Optional – description of the EtherNet/IP bridge.                                                                                                                                                                                                                                                                                                                                                                                                                           |
| IP Address             | The IP address of the EtherNet/IP bridge.                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Host Name              | Not used.                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Slot                   | The slot of the EtherNet/IP bridge in the rack.                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Revision               | The minor revision of the firmware in the bridge. (You already set the major revision by selecting the bridge series in Step 3.)                                                                                                                                                                                                                                                                                                                                            |
| Electronic Keying      | <b>Compatible Keying.</b> The “Compatible Keying” setting for Electronic Keying ensures the physical module is consistent with the software configuration before the controller and bridge make a connection. Therefore, ensure that you have set the correct revision in this screen. Refer to the online Help for additional information on this and other Electronic Keying settings. If keying is not required, select “Disable Keying.” Disable keying is recommended. |
| Open Module Properties | When this box is checked, additional module properties screens will appear to further configure the bridge after clicking <b>OK</b> . When unchecked, the bridge's New Module screen will close after clicking <b>OK</b> . For this example, uncheck this box.                                                                                                                                                                                                              |

6. Click **OK**. The bridge is now configured for the EtherNet/IP network and added to the RSLogix 5000 project. It appears in the I/O Configuration folder. In our example, a 1756-ENBT bridge appears under the I/O Configuration folder (Figure 4.6) with its assigned name. For convenience, keep the project open. Later in this chapter the project will need to be downloaded to the controller.

**Figure 4.6    RSLogix 5000: I/O Configuration Folder**



There are three ways to add the adapter into the I/O configuration:

- Drive Add-On Profiles (RSLogix 5000 version 16 or later)
- Classic Profile (RSLogix 5000 versions 13...15)
- Generic Profile (RSLogix 5000 all versions)

These are described in separate sections below. If your version of RSLogix 5000 supports Add-On Profiles, we highly recommend using this method.

## Using RSLogix 5000 Drive Add-On Profiles (version 16 or later)

When compared to using the RSLogix 5000 Classic Profile (versions 13...15) or Generic Profile (all versions), the RSLogix 5000 Drive Add-On Profiles provide these advantages:

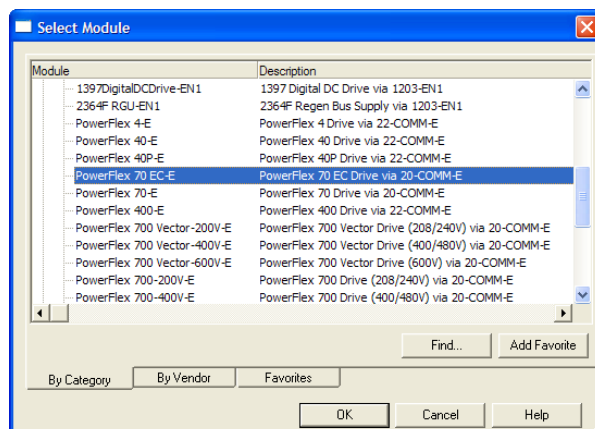
- Profiles for specific drives that provide descriptive controller tags for basic control I/O words (Logic Command/Status and Reference/Feedback) and Datalinks. Additionally, Datalinks automatically take the name of the drive parameter to which they are assigned. These profiles virtually eliminate I/O mismatch errors and substantially reduce drive configuration time.
- New Drive tab eliminates the need for a separate drive software configuration tool.
- Drive configuration settings are saved as part of the RSLogix 5000 (v16 or later) project file (.ACD) and also downloaded to the controller.
- Unicast connection (version 18 or later)
- Drive Add-On Profiles can be updated anytime. When a new drive is used or to benefit from new updates for Add-On Profiles, you will need the newest Add-On Profile update. Go to [www.ab.com/support/abdrives/webupdate](http://www.ab.com/support/abdrives/webupdate) to download the latest RSLogix 5000 drive Add-On Profile. To determine your drive Add-On Profile version, refer to Allen-Bradley Knowledgebase document #65882.

### Adding the Drive/Adapter to the I/O Configuration

To transmit data between the bridge and the drive, you must add the drive as a child device to the parent bridge. In this example, RSLogix 5000 version 16 is used with drive Add-On Profile version 3.01.

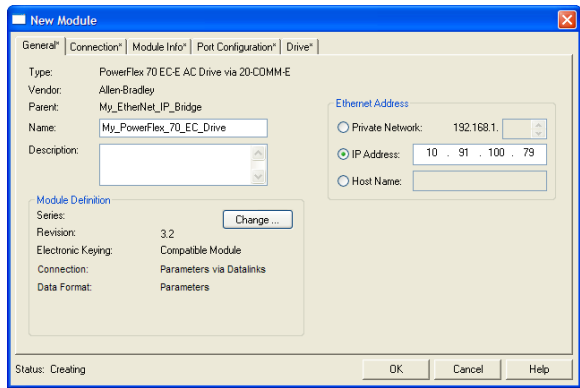
1. In the treeview, right-click on the bridge and select **New Module...** to display the Select Module screen. In our example, we right-click on the 1756-ENBT/A bridge. Expand the Drives group to display all of the available drives with their communication adapters.

**Figure 4.7 Drive Select Module Screen**



- **TIP:** If the PowerFlex drive is not shown, go to [www.ab.com/support/abdrives/webupdate](http://www.ab.com/support/abdrives/webupdate) and download the latest RSLogix 5000 drive Add-On Profile.
2. From the list (Figure 4.7), select the drive and its connected adapter. For this example, we selected “PowerFlex 70 EC-E.” Then click **OK**. The drive’s New Module screen (Figure 4.8) appears.

**Figure 4.8    Drive New Module Screen**



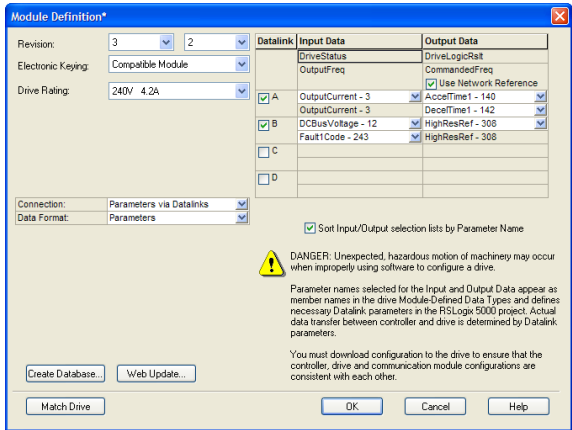
3. On the General tab, edit the following data about the drive/adapter:

| Box         | Setting                                      |
|-------------|----------------------------------------------|
| Name        | A name to identify the drive.                |
| Description | Optional – description of the drive/adapter. |
| IP Address  | The IP address of the adapter.               |

4. On the New Module screen in the Module Definition section, click **Change...** to launch the Module Definition screen (Figure 4.9) and begin the drive/adapter configuration process. In this example, Datalinks are used to do the following:

| Read...                       | Write to...                               |
|-------------------------------|-------------------------------------------|
| Output Current (Parameter 3)  | Accel Time 1 (Parameter 140)              |
| DC Bus Voltage (Parameter 12) | Decel Time 1 (Parameter 142)              |
| Fault 1 Code (Parameter 243)  | High Resolution Reference (Parameter 308) |

**Figure 4.9    Module Definition Screen**



 **TIP:** To get the latest RSLogix 5000 drive Add-On Profile, go to [www.ab.com/support/abdrives/webupdate](http://www.ab.com/support/abdrives/webupdate).

5. In the Module Definition screen, edit the following information:

| Box                            | Setting                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Revision                       | <p>The major and minor revision of the firmware (database) in the drive. If the drive's major and minor revision is not available, the drive database is not installed on your computer. To get the correct database revision, use one of the following buttons at the bottom left of the Module Definition screen:</p> <ul style="list-style-type: none"> <li>• <b>Create Database...</b> Creates a database from an online network drive. Clicking this button displays an RSLinx RSWho window. Browse to the online drive (for this example, PowerFlex 70 EC), select it, and click <b>OK</b>. The database will be uploaded and stored on the computer. Thereafter, close the Module Definition screen and then re-open it to display the new revision.</li> <li>• <b>Web Update...</b> When a drive is not available online, opens the Allen-Bradley Drives Web Updates web site to download a specific database file. After downloading the file, close the Module Definition screen and then re-open it to display the new revision.</li> <li>• <b>Match Drive:</b> Use this button when the drive being added to the network matches the drive profile (revision, rating, configuration settings, etc.) of an existing online network drive. Click this button to conveniently create a duplicate drive profile from the online drive, and automatically load this identical information into the Module Definition screen. This eliminates the need to manually enter the information each time a new drive with a matching profile is added to the network.</li> </ul> |
| Electronic Keying              | <p><b>Compatible Module.</b> The "Compatible Module" setting for Electronic Keying ensures the physical module is consistent with the software configuration before the controller and bridge make a connection. Therefore, ensure that you have set the correct revision in this screen. Refer to the online Help for additional information on this and other Electronic Keying settings. If keying is not required, select "Disable Keying." Drives do not require keying, and so "Disable Keying" is recommended.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Drive Rating                   | <p>The voltage and current rating of the drive. If the drive rating is not listed, the drive database is not installed on your computer. To get the correct drive rating, use the <b>Create Database...</b>, <b>Web Update...</b>, or <b>Match Drive</b> button described above.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Connection                     | <p><b>Parameters via Datalinks.</b> When selecting "Parameters via Datalinks" (default), the controller tags for the Datalinks use the drive parameter names to which they are assigned. When selecting "Datalinks," the controller tags for the Datalinks have non-descriptive UserDefinedData[n] names like those used in RSLogix 5000 version 15.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Data Format                    | <p><b>Parameters.</b> When the Connection field is set to "Parameters via Datalinks," "Parameters" is automatically selected. When the Connection field is set to "Datalinks," you must select the number of Datalinks required for your application in the "Data Format" field.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Datalink A, B, C, D            | <p>In the Input Data column, assigns selected drive parameters to be READ by the controller. In the Output Data column, assigns selected drive parameters to be WRITTEN by the controller.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Sort Input/Output selection... | <p>When this box is checked, sorts the Input Data and Output Data assigned parameters by name and then by number, and enables parameter search by name. When unchecked, sorts the assigned parameters by parameter number and then by name, and enables parameter search by number.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Use Network Reference          | <p>Conveniently selects the speed reference for the drive to come from the network. This box is checked by default.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

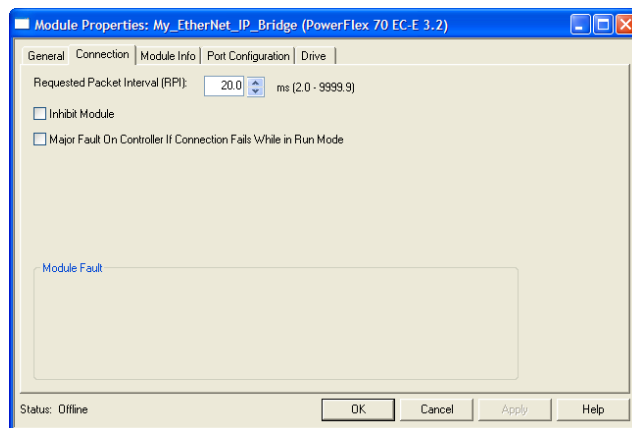
When a 32-bit parameter is selected for Input Data or Output Data for a drive with 16-bit Datalinks, two contiguous Datalinks (for example, x1 and x2, where x = A, B, C or D) are automatically assigned as a pair to represent that parameter. See Datalink examples in [Figure 4.9](#). For more information on Datalinks, see [Using Datalinks on page 5-7](#).

On the Module Definition screen, notice that the automatically-assigned controller tags DriveStatus, OutputFreq, DriveLogicRslt, and CommandedFreq are always used.

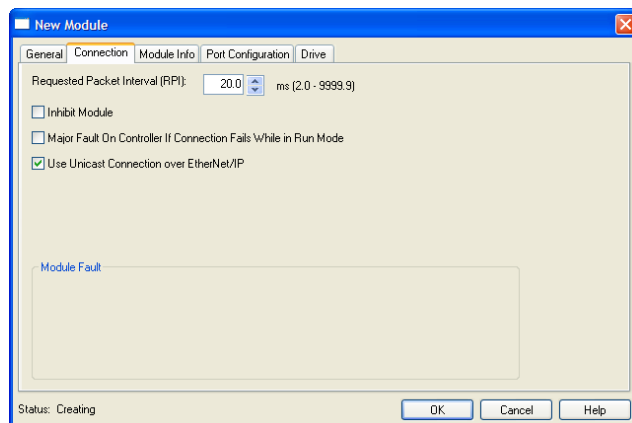
When a Datalink is enabled, the following 20-COMM-E adapter I/O parameters are automatically set:

- **Parameter 23 - [DPI I/O Cfg]** turns on the enabled Datalink bit so the 20-COMM-E adapter will communicate that Datalink's information with the drive.
  - **Parameter 35 - [M-S Input]** turns on the enabled Datalink bit so the 20-COMM-E adapter will input that Datalink's information from the controller.
  - **Parameter 36 - [M-S Output]** turns on the enabled Datalink bit so the 20-COMM-E adapter will output that Datalink's information to the controller.
6. Click **OK** on the Module Definition screen to save the drive and adapter configuration and close the screen. The drive's New Module screen reappears.
  7. On the New Module screen, click the Connection tab ([Figure 4.10](#)).

**Figure 4.10 New Module Connection Tab Screen**



Screen for  
RSLogix 5000  
versions 16 and 17



Screen for  
RSLogix 5000  
version 18 (or later)

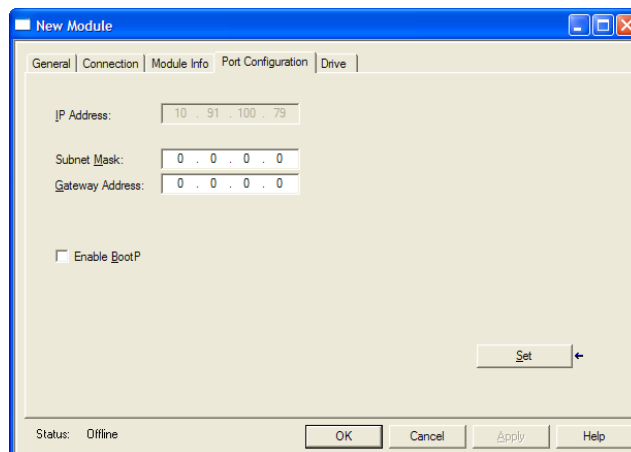
8. In the “Requested Packet Interval (RPI)” box, set the value to 5.0 milliseconds or greater. This value determines the maximum interval that a controller should use to move data to and from the adapter. To conserve bandwidth, use higher values for communicating with low priority devices.

The “Inhibit Module” box, when checked, inhibits the module from communicating with the RSLogix 5000 project. When the “Major Fault on ...” box is checked, a major controller fault will occur when the module’s connection fails while the controller is in the Run Mode. For this example, leave the “Inhibit Module” and “Major Fault On ...” boxes unchecked.

Unicast support has been added to RSLogix 5000 version 18. However, to also support unicast, the controller firmware must be version 18 (or later) and the 20-COMM-E Series B adapter at version 4.001 (or later). Unicast is recommended whenever possible. For the benefits of unicast operation, see [Preparing for an Installation on page 2-1](#). If unicast is selected and the 20-COMM-E adapter does not support it, the connection will be rejected. In this case, either update the 20-COMM-E firmware to version 4.001 (or later) or uncheck the “Use Unicast Connection over EtherNet/IP” checkbox ([Figure 4.10](#)).

9. On the New Module screen, click the Port Configuration tab ([Figure 4.11](#)).

**Figure 4.11 New Module Port Configuration Tab Screen**



10. In the Port Configuration tab screen, edit the following information:

| Box             | Setting                                                                                                                                                                                                                                                                             |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| IP Address      | The IP address of the adapter that was already set in the General tab. This field is not configurable (grayed out).                                                                                                                                                                 |
| Subnet Mask     | The Subnet Mask configuration setting of the network. This setting must match the setting of other devices on the network (for example, 255.255.255.0).                                                                                                                             |
| Gateway Address | The Gateway Address configuration setting of the network. This setting must match the setting of other devices on the network (for example, 10.91.100.1).                                                                                                                           |
| Enable BootP    | When this box is checked, BOOTP is enabled in the adapter and will ignore the IP address set in the General tab. When unchecked, the controller uses the set IP address. This is another method to enable/disable BOOTP in the adapter. For this example, leave this box unchecked. |

11. Click **Set** to save the Port Configuration information which sets the corresponding offline Subnet Cfg x and Gateway Cfg x parameters in the adapter.
12. Click **OK** on the New Module screen. The new node (for this example, “My\_PowerFlex\_70\_EC\_Drive”) now appears under the bridge (for this example, “My\_EtherNet\_IP\_Bridge”) in the I/O Configuration folder. If you double-click on the Controller Tags, you will see that module-defined data types and tags have been automatically created (Figure 4.12). Note that all tag names are defined and Datalinks include the assigned drive parameter name. After you save and download the configuration, these tags allow you to access the Input and Output data of the drive via the controller’s ladder logic.

Figure 4.12 Controller Tags

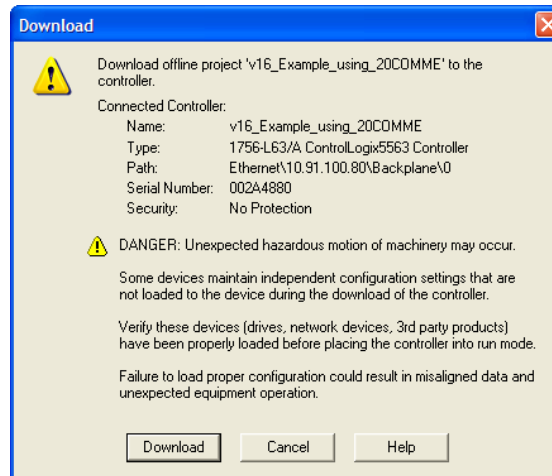
| Name                                                  | Value     | Force Mask | Style   | Data Type          |
|-------------------------------------------------------|-----------|------------|---------|--------------------|
| My_PowerFlex_70_EC_Drive:I                            | {...}     | {...}      |         | AB:PowerFlex70E... |
| My_PowerFlex_70_EC_Drive:I.DriveStatus                | 2#0000... |            | Binary  | INT                |
| My_PowerFlex_70_EC_Drive:I.DriveStatus_Ready          | 0         |            | Decimal | BOOL               |
| My_PowerFlex_70_EC_Drive:I.DriveStatus_Active         | 0         |            | Decimal | BOOL               |
| My_PowerFlex_70_EC_Drive:I.DriveStatus_CommandDir     | 0         |            | Decimal | BOOL               |
| My_PowerFlex_70_EC_Drive:I.DriveStatus_ActualDir      | 0         |            | Decimal | BOOL               |
| My_PowerFlex_70_EC_Drive:I.DriveStatus_Accelerating   | 0         |            | Decimal | BOOL               |
| My_PowerFlex_70_EC_Drive:I.DriveStatus_Decelerating   | 0         |            | Decimal | BOOL               |
| My_PowerFlex_70_EC_Drive:I.DriveStatus_Alarm          | 0         |            | Decimal | BOOL               |
| My_PowerFlex_70_EC_Drive:I.DriveStatus_Faulted        | 0         |            | Decimal | BOOL               |
| My_PowerFlex_70_EC_Drive:I.DriveStatus_AltSpeed       | 0         |            | Decimal | BOOL               |
| My_PowerFlex_70_EC_Drive:I.DriveStatus_LocalID0       | 0         |            | Decimal | BOOL               |
| My_PowerFlex_70_EC_Drive:I.DriveStatus_LocalID1       | 0         |            | Decimal | BOOL               |
| My_PowerFlex_70_EC_Drive:I.DriveStatus_LocalID2       | 0         |            | Decimal | BOOL               |
| My_PowerFlex_70_EC_Drive:I.DriveStatus_SpdRefID0      | 0         |            | Decimal | BOOL               |
| My_PowerFlex_70_EC_Drive:I.DriveStatus_SpdRefID1      | 0         |            | Decimal | BOOL               |
| My_PowerFlex_70_EC_Drive:I.DriveStatus_SpdRefID2      | 0         |            | Decimal | BOOL               |
| My_PowerFlex_70_EC_Drive:I.DriveStatus_SpdRefID3      | 0         |            | Decimal | BOOL               |
| My_PowerFlex_70_EC_Drive:I.OutputFreq                 | 0         |            | Decimal | INT                |
| My_PowerFlex_70_EC_Drive:I.OutputCurrent              | 0         |            | Decimal | DINT               |
| My_PowerFlex_70_EC_Drive:I.DCBusVoltage               | 0         |            | Decimal | INT                |
| My_PowerFlex_70_EC_Drive:I.Fault1Code                 | 0         |            | Decimal | INT                |
| My_PowerFlex_70_EC_Drive:O                            | {...}     | {...}      |         | AB:PowerFlex70E... |
| My_PowerFlex_70_EC_Drive:O.DriveLogicRslt             | 2#0000... |            | Binary  | INT                |
| My_PowerFlex_70_EC_Drive:O.DriveLogicRslt_Stop        | 0         |            | Decimal | BOOL               |
| My_PowerFlex_70_EC_Drive:O.DriveLogicRslt_Start       | 0         |            | Decimal | BOOL               |
| My_PowerFlex_70_EC_Drive:O.DriveLogicRslt_Jog         | 0         |            | Decimal | BOOL               |
| My_PowerFlex_70_EC_Drive:O.DriveLogicRslt_ClearFault  | 0         |            | Decimal | BOOL               |
| My_PowerFlex_70_EC_Drive:O.DriveLogicRslt_Forward     | 0         |            | Decimal | BOOL               |
| My_PowerFlex_70_EC_Drive:O.DriveLogicRslt_Reverse     | 0         |            | Decimal | BOOL               |
| My_PowerFlex_70_EC_Drive:O.DriveLogicRslt_LocalContnl | 0         |            | Decimal | BOOL               |
| My_PowerFlex_70_EC_Drive:O.DriveLogicRslt_MOPInc      | 0         |            | Decimal | BOOL               |
| My_PowerFlex_70_EC_Drive:O.DriveLogicRslt_Accel1      | 0         |            | Decimal | BOOL               |
| My_PowerFlex_70_EC_Drive:O.DriveLogicRslt_Accel2      | 0         |            | Decimal | BOOL               |
| My_PowerFlex_70_EC_Drive:O.DriveLogicRslt_Decel1      | 0         |            | Decimal | BOOL               |
| My_PowerFlex_70_EC_Drive:O.DriveLogicRslt_Decel2      | 0         |            | Decimal | BOOL               |
| My_PowerFlex_70_EC_Drive:O.DriveLogicRslt_SpdRefID0   | 0         |            | Decimal | BOOL               |
| My_PowerFlex_70_EC_Drive:O.DriveLogicRslt_SpdRefID1   | 0         |            | Decimal | BOOL               |

### Saving the I/O Configuration to the Controller

After adding the bridge and drive/adapter to the I/O configuration, you must download the configuration to the controller. You should also save the configuration to a file on your computer.

1. In the RSLogix 5000 window, select **Communications > Download**. The Download dialog box (Figure 4.13) appears.

Figure 4.13 Download Dialog Box



► **TIP:** If a message box reports that RSLogix 5000 is unable to go online, select **Communications > Who Active** to find your controller in the Who Active screen. After finding and selecting the controller, click **Set Project Path** to establish the path. If your controller does not appear, you need to add or configure the EtherNet/IP driver in RSLinx. Refer to the RSLinx online help.

2. Click **Download** to download the configuration to the controller. When the download is successfully completed, RSLogix 5000 goes into the Online mode and the I/O Not Responding box in the upper-left of the window should be flashing green. Also, a yellow warning symbol ⚠ should be displayed on the I/O Configuration folder in the treeview and on the drive profile.

If the controller was in Run Mode before clicking **Download**, RSLogix 5000 prompts you to change the controller mode back to Remote Run. In this case, choose the appropriate mode for your application. If the controller was in Program Mode before clicking **Download**, this prompt will not appear.

3. Select **File > Save**. If this is the first time you saved the project, the Save As dialog box appears. Navigate to a folder, type a file name, and click **Save** to save the configuration to a file on your computer.

To ensure that the present project configuration values are saved, RSLogix 5000 prompts you to upload them. Click **Yes** to upload/save.

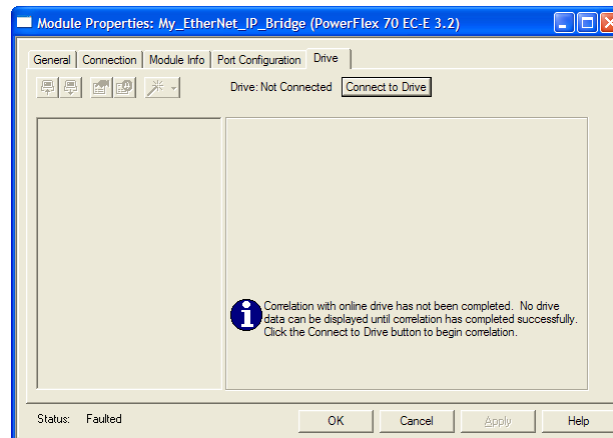
### Correlating the Drive with the Controller

You must now correlate the drive settings to the RSLogix 5000 project I/O settings so that they match. This requires loading the project I/O settings into the drive.

1. In the treeview under I/O Configuration, right-click on the drive profile (for this example My\_PowerFlex\_70\_EC\_Drive) and select **Properties**.

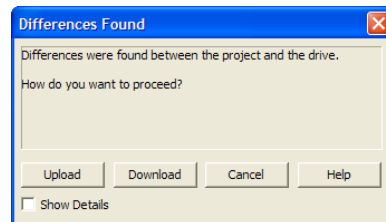
- Click the Drive tab and then click **Connect to Drive** (Figure 4.14) to begin the correlation process.

Figure 4.14 Drive Correlation Screen



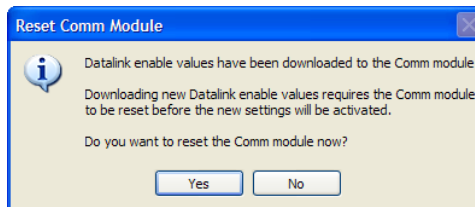
If the Differences Found screen (Figure 4.15) appears—which is typical, click **Download**. This will download the project settings from the controller to the drive and its connected adapter. If **Upload** is clicked, the drive and adapter settings are uploaded to the controller.

Figure 4.15 Differences Found Screen



- When the Reset Comm Module screen (Figure 4.16) appears, click **Yes** to reset the communication adapter so that the new I/O settings take effect.

Figure 4.16 Reset Comm Module Screen



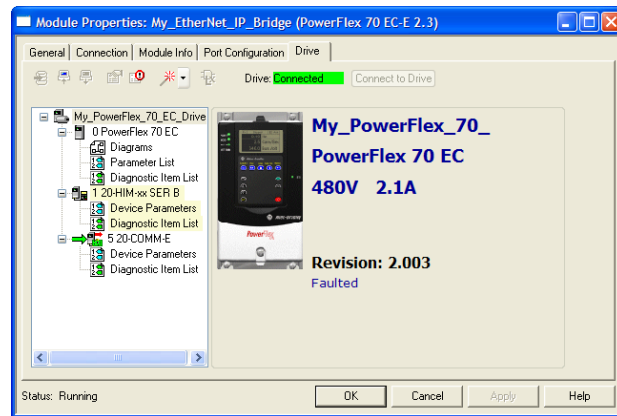
After resetting the communication module, which may take up to a minute to complete, the I/O OK box in the upper-left of the RSLogix 5000 window should now be steady green and the yellow warning symbols ⚠ in the treeview under the I/O Configuration folder and drive profile should be gone.



**TIP:** If the yellow warning symbol ⚠ for your drive remains displayed, first try power cycling the drive. Otherwise, double-click the drive under the I/O tree and click the Connection tab to find the cause of the problem.

4. The Module Properties Drive Tab screen ([Figure 4.17](#)) re-appears. You can view the drive's Parameter List, Diagnostic Items List, and lists for any connected peripheral, including the 20-COMM-E. While connected to the drive, you can dynamically change values of parameters. Diagnostic items and diagram views can be used for troubleshooting. [Table 7.A on page 7-4](#) provides diagnostic items for troubleshooting the adapter.

**Figure 4.17** Module Properties Drive Tab Screen



5. When finished, click **OK** to close the Module Properties screen for the drive.

## Using the RSLogix 5000 Classic Profile (versions 13...15)

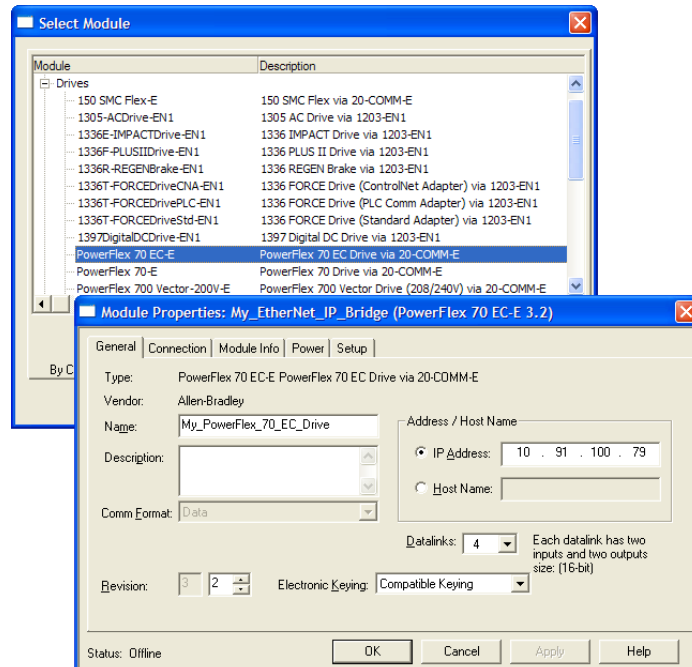
When compared to using the RSLogix 5000 Generic Profile (all versions), the RSLogix 5000 Classic Profile provides these advantages:

- Profiles for specific drives ([Figure 4.18](#)) that provide descriptive controller tags for basic control I/O words (Logic Command/Status and Reference/Feedback). The controller tags for Datalinks, however, have non-descriptive UserDefinedData[n] names.
- Improved I/O configuration—no I/O assembly configuration required. Basic control I/O is defined, but Datalinks still need to be configured/mapped.
- The Setup tab includes a DriveExecutive icon link to conveniently launch DriveExecutive (when installed on computer) to match the adapter I/O configuration with the controller, and to assign the Datalink parameters in the drive. This reduces I/O mismatches.



**TIP:** Since the RSLogix 5000 Classic Profile has been significantly improved upon by RSLogix 5000 Drive Add-On Profiles (version 16 or later), it is highly recommended to use RSLogix 5000 Drive Add-On Profiles to take advantage of its benefits (more intuitive, time saving, and less likely to make I/O configuration errors).

**Figure 4.18 Classic Profile Screens for Drives**



When Datalinks are used, you must enable the desired Datalinks and assign names to their non-descriptive controller tags. When a Datalink is enabled, you must set the following adapter I/O parameters:

- **Parameter 23 - [DPI I/O Cfg]** turns on the enabled Datalink bit so the 20-COMM-E adapter will communicate that Datalink's information with the drive.
- **Parameter 35 - [M-S Input]** turns on the enabled Datalink bit so the 20-COMM-E adapter will input that Datalink's information from the controller.
- **Parameter 36 - [M-S Output]** turns on the enabled Datalink bit so the 20-COMM-E adapter will output that Datalink's information to the controller.

When using Datalinks, up to 8 drive [Data In xx] parameters (300...307) and/or up to 8 [Data Out xx] parameters (310...317) must be assigned to point to the appropriate drive parameters for your application.

### Using the RSLogix 5000 Generic Profile (all versions)

The basic RSLogix 5000 Generic Profile is only recommended when:

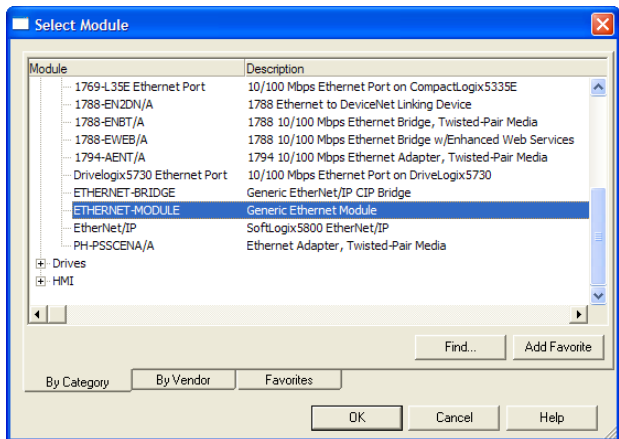
- A specific drive profile in other versions of RSLogix 5000 is unavailable.
- Users are already familiar with a drive Generic Profile and do not want to convert an existing project to a Classic Profile (versions 13...15) or a drive Add-On Profile (version 16 or later).
- A project must maintain specific revision level control.
- The controller cannot be taken offline. RSLogix 5000 version 16 (or later) enables the drive Generic Profile to be added while the controller is online and in the Run mode.

#### Adding the Drive/Adapter to the I/O Configuration

To transmit data between the bridge and the drive, you must add the drive as a child device to the parent bridge.

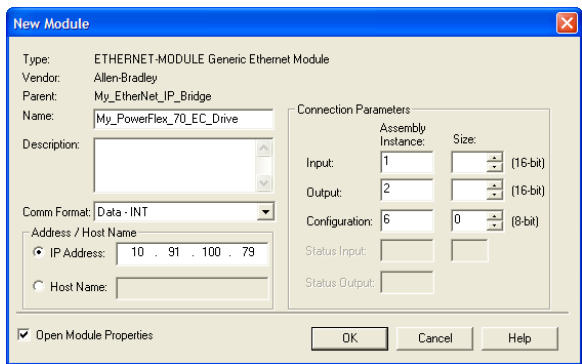
1. In the treeview, right-click on the bridge and select **New Module...** to display the Select Module screen ([Figure 4.19](#)). In our example, we right-click on the 1756-ENBT/A bridge. Expand the Communications group to display all of the available communication modules.

Figure 4.19    Select Module Screen



2. Select “ETHERNET-MODULE” from the list (Figure 4.19) to configure the drive and its connected 20-COMM-E adapter, and then click **OK**. The drive’s New Module screen (Figure 4.20) appears.

Figure 4.20    Drive New Module Screen



3. Edit the following information about the drive/adapter:

| Box                    | Setting                                                                                                                                                                                                                                                           |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Name                   | A name to identify the drive and adapter.                                                                                                                                                                                                                         |
| Description            | Optional – description of the drive/adapter.                                                                                                                                                                                                                      |
| Comm Format            | <b>Data - INT</b> (This setting formats the data in 16-bit words.)                                                                                                                                                                                                |
| IP Address             | The IP address of the adapter.                                                                                                                                                                                                                                    |
| Open Module Properties | When this box is checked, the drive’s New Module screen will close when clicking <b>OK</b> . When unchecked, additional module properties screens will appear to further configure the drive/adapter when <b>OK</b> is clicked. For this example, check this box. |

4. Under Connection Parameters, edit the following:

| Box           | Assembly Instance           | Size                                                                                                                                                                                                                                                                                                                                           |
|---------------|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Input         | 1 (This value is required.) | The value will vary based on your application (setting of <b>Parameters 23 - [DPI I/O Cfg]</b> and <b>36 - [M-S Output]</b> ) and the size (16-bit or 32-bit) of the Reference/Feedback and Datalinks in the drive. Refer to <a href="#">Table 4.A</a> , <a href="#">Table 4.B</a> or <a href="#">Table 4.C</a> on <a href="#">page 4-17</a> . |
| Output        | 2 (This value is required.) | The value will vary based on your application (setting of <b>Parameters 23 - [DPI I/O Cfg]</b> and <b>35 - [M-S Input]</b> ) and the size (16-bit or 32-bit) of the Reference/Feedback and Datalinks in the drive. Refer to <a href="#">Table 4.A</a> , <a href="#">Table 4.B</a> or <a href="#">Table 4.C</a> on <a href="#">page 4-17</a> .  |
| Configuration | 6 (This value is required.) | 0 (This value is required.)                                                                                                                                                                                                                                                                                                                    |

The following tables define the number of 16-bit words that you need to enter for the Input Size and Output Size boxes depending on your configuration.

**Table 4.A PowerFlex 70/700/700H and SMC Flex (16-bit Reference/Feedback and 16-bit Datalinks)**

| Logic Command/Status | Ref/Fdbk (16-bit) | Datalinks (16-bit) |   |   |   | User Configured Settings |        |                         |                       |                        |
|----------------------|-------------------|--------------------|---|---|---|--------------------------|--------|-------------------------|-----------------------|------------------------|
|                      |                   | A                  | B | C | D | Size in Words            |        | Par. 23 - [DPI I/O Cfg] | Par. 35 - [M-S Input] | Par. 36 - [M-S Output] |
|                      |                   |                    |   |   |   | Input                    | Output |                         |                       |                        |
| ✓                    | ✓                 |                    |   |   |   | 4                        | 2      | ...0 0001               | ...0 0001             | ...0 0001              |
| ✓                    | ✓                 | ✓                  |   |   |   | 6                        | 4      | ...0 0011               | ...0 0011             | ...0 0011              |
| ✓                    | ✓                 | ✓                  | ✓ |   |   | 8                        | 6      | ...0 0111               | ...0 0111             | ...0 0111              |
| ✓                    | ✓                 | ✓                  | ✓ | ✓ |   | 10                       | 8      | ...0 1111               | ...0 1111             | ...0 1111              |
| ✓                    | ✓                 | ✓                  | ✓ | ✓ | ✓ | 12                       | 10     | ...1 1111               | ...1 1111             | ...1 1111              |

**Table 4.B PowerFlex 700 VC (16-bit Reference/Feedback and 32-bit Datalinks)**

| Logic Command/Status | Ref/Fdbk (16-bit) | Datalinks (32-bit) |   |   |   | User Configured Settings |        |                         |                       |                        |
|----------------------|-------------------|--------------------|---|---|---|--------------------------|--------|-------------------------|-----------------------|------------------------|
|                      |                   | A                  | B | C | D | Size in Words            |        | Par. 23 - [DPI I/O Cfg] | Par. 35 - [M-S Input] | Par. 36 - [M-S Output] |
|                      |                   |                    |   |   |   | Input                    | Output |                         |                       |                        |
| ✓                    | ✓                 |                    |   |   |   | 4                        | 2      | ...0 0001               | ...0 0001             | ...0 0001              |
| ✓                    | ✓                 | ✓                  |   |   |   | 8                        | 6      | ...0 0011               | ...0 0011             | ...0 0011              |
| ✓                    | ✓                 | ✓                  | ✓ |   |   | 12                       | 10     | ...0 0111               | ...0 0111             | ...0 0111              |
| ✓                    | ✓                 | ✓                  | ✓ | ✓ |   | 16                       | 14     | ...0 1111               | ...0 1111             | ...0 1111              |
| ✓                    | ✓                 | ✓                  | ✓ | ✓ | ✓ | 20                       | 18     | ...1 1111               | ...1 1111             | ...1 1111              |

**Table 4.C PowerFlex 700S/750-Series (32-bit Reference/Feedback and 32-bit Datalinks)**

| Logic Command/Status | Ref/Fdbk (32-bit) | Datalinks (32-bit) |   |   |   | User Configured Settings |        |                         |                       |                        |
|----------------------|-------------------|--------------------|---|---|---|--------------------------|--------|-------------------------|-----------------------|------------------------|
|                      |                   | A                  | B | C | D | Size in Words            |        | Par. 23 - [DPI I/O Cfg] | Par. 35 - [M-S Input] | Par. 36 - [M-S Output] |
|                      |                   |                    |   |   |   | Input                    | Output |                         |                       |                        |
| ✓                    | ✓                 |                    |   |   |   | 6                        | 4      | ...0 0001               | ...0 0001             | ...0 0001              |
| ✓                    | ✓                 | ✓                  |   |   |   | 10                       | 8      | ...0 0011               | ...0 0011             | ...0 0011              |
| ✓                    | ✓                 | ✓                  | ✓ |   |   | 14                       | 12     | ...0 0111               | ...0 0111             | ...0 0111              |
| ✓                    | ✓                 | ✓                  | ✓ | ✓ |   | 18                       | 16     | ...0 1111               | ...0 1111             | ...0 1111              |
| ✓                    | ✓                 | ✓                  | ✓ | ✓ | ✓ | 22                       | 20     | ...1 1111               | ...1 1111             | ...1 1111              |

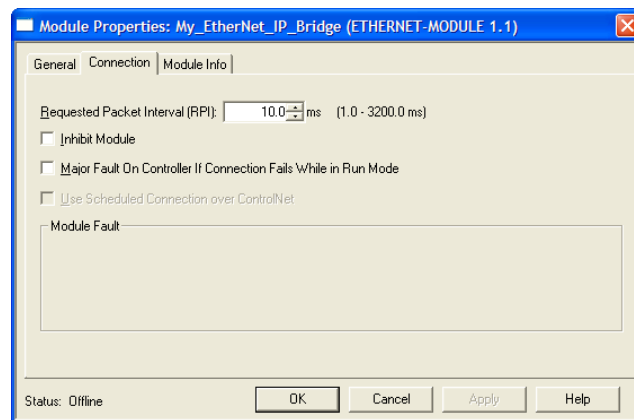


**TIP:** For instructions on configuring the I/O for the adapter using **Parameter 23 - [DPI I/O Cfg]** and its Master-Slave Hierarchy using **Parameters 35 - [M-S Input]** and **36 - [M-S Output]**, see [Setting the I/O Configuration on page 3-8](#).

When using Datalinks, up to 8 drive [Data In xx] parameters (300...307) and/or up to 8 [Data Out xx] parameters (310...317) must be assigned to point to the appropriate drive parameters for your application.

5. After setting the information in the drive's New Module screen, click **OK**. The Module Properties screen appears.
6. Click the Connection tab ([Figure 4.21](#)).

**Figure 4.21 Module Properties Connection Tab Screen**



7. In the “Requested Packet Interval (RPI)” box, set the value to 5.0 milliseconds or greater. This value determines the maximum interval that a controller should use to move data to and from the adapter. To conserve bandwidth, use higher values for communicating with low priority devices. For this example, leave the “Inhibit Module” and Major Fault ...” boxes unchecked.
8. Click **OK**. The new node (for this example, “My\_PowerFlex\_70\_EC\_Drive”) now appears under the bridge (for this example, “My\_EtherNet\_IP\_Bridge”) in the I/O Configuration folder. If you double-click on the Controller Tags, you will see that module-defined data types and tags have been automatically created ([Figure 4.22](#)). After you save and download the configuration, these tags allow you to access the Input and Output data of the drive via the controller’s ladder logic.

For this example, all Datalinks (A, B, C, and D) are enabled. The Input Size is set to 12 words and the Output Size is set to 10 words. Also, the following adapter I/O parameters are set to these values:

| Adapter Parameter No. | Setting             |
|-----------------------|---------------------|
| 23 - [DPI I/O Cfg]    | xxxx xxxx xxx1 1111 |
| 35 - [M-S Input]      | xxxx xxxx xxx1 1111 |
| 36 - [M-S Output]     | xxxx xxxx xxx1 1111 |

9. Reset the adapter (see [Resetting the Adapter on page 3-17](#)) or power cycle the drive.

For the drive speed reference and Datalink parameter values and the adapter setup parameter values, refer to [Drive and Adapter Parameter Settings on page 5-12](#).

**Figure 4.22 Controller Tags**

| Name                                  | Value | Force Mask | Style   | Data Type       |
|---------------------------------------|-------|------------|---------|-----------------|
| + My_PowerFlex_70_EC_Drive:C          | {...} | {...}      |         | AB:ETHERNET_... |
| - My_PowerFlex_70_EC_Drive:I          | {...} | {...}      |         | AB:ETHERNET_... |
| - My_PowerFlex_70_EC_Drive:I.Data     | {...} | {...}      | Decimal | INT[12]         |
| + My_PowerFlex_70_EC_Drive:I.Data[0]  | 0     |            | Decimal | INT             |
| + My_PowerFlex_70_EC_Drive:I.Data[1]  | 0     |            | Decimal | INT             |
| + My_PowerFlex_70_EC_Drive:I.Data[2]  | 0     |            | Decimal | INT             |
| + My_PowerFlex_70_EC_Drive:I.Data[3]  | 0     |            | Decimal | INT             |
| + My_PowerFlex_70_EC_Drive:I.Data[4]  | 0     |            | Decimal | INT             |
| + My_PowerFlex_70_EC_Drive:I.Data[5]  | 0     |            | Decimal | INT             |
| + My_PowerFlex_70_EC_Drive:I.Data[6]  | 0     |            | Decimal | INT             |
| + My_PowerFlex_70_EC_Drive:I.Data[7]  | 0     |            | Decimal | INT             |
| + My_PowerFlex_70_EC_Drive:I.Data[8]  | 0     |            | Decimal | INT             |
| + My_PowerFlex_70_EC_Drive:I.Data[9]  | 0     |            | Decimal | INT             |
| + My_PowerFlex_70_EC_Drive:I.Data[10] | 0     |            | Decimal | INT             |
| + My_PowerFlex_70_EC_Drive:I.Data[11] | 0     |            | Decimal | INT             |
| - My_PowerFlex_70_EC_Drive:O          | {...} | {...}      |         | AB:ETHERNET_... |
| - My_PowerFlex_70_EC_Drive:O.Data     | {...} | {...}      | Decimal | INT[10]         |
| + My_PowerFlex_70_EC_Drive:O.Data[0]  | 0     |            | Decimal | INT             |
| + My_PowerFlex_70_EC_Drive:O.Data[1]  | 0     |            | Decimal | INT             |
| + My_PowerFlex_70_EC_Drive:O.Data[2]  | 0     |            | Decimal | INT             |
| + My_PowerFlex_70_EC_Drive:O.Data[3]  | 0     |            | Decimal | INT             |
| + My_PowerFlex_70_EC_Drive:O.Data[4]  | 0     |            | Decimal | INT             |
| + My_PowerFlex_70_EC_Drive:O.Data[5]  | 0     |            | Decimal | INT             |
| + My_PowerFlex_70_EC_Drive:O.Data[6]  | 0     |            | Decimal | INT             |
| + My_PowerFlex_70_EC_Drive:O.Data[7]  | 0     |            | Decimal | INT             |
| + My_PowerFlex_70_EC_Drive:O.Data[8]  | 0     |            | Decimal | INT             |
| + My_PowerFlex_70_EC_Drive:O.Data[9]  | 0     |            | Decimal | INT             |

### Saving the I/O Configuration to the Controller

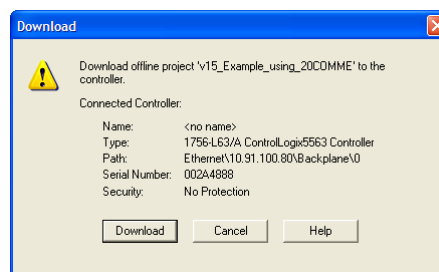
After adding the bridge and drive/adapter to the I/O configuration, you must download the configuration to the controller. You should also save the configuration to a file on your computer.



**TIP:** When using RSLogix 5000 version 16 (or later), you can add the I/O configuration of a Generic Profile while the controller is online and in the Run mode.

1. In the RSLogix 5000 window, select **Communications > Download**. The Download dialog box ([Figure 4.23](#)) appears.

**Figure 4.23 Download Dialog Box**





**TIP:** If a message box reports that RSLogix 5000 is unable to go online, select **Communications > Who Active** to find your controller in the Who Active screen. After finding and selecting the controller, click **Set Project Path** to establish the path. If your controller does not appear, you need to add or configure the EtherNet/IP driver in RSLinx. See [Using RSLinx Classic on page 4-1](#) for details.

2. Click **Download** to download the configuration to the controller. When the download is successfully completed, RSLogix 5000 goes into the Online mode and the I/O OK box in the upper-left of the screen should be steady green.
3. Select **File > Save**. If this is the first time you saved the project, the Save As dialog box appears. Navigate to a folder, type a file name, and click **Save** to save the configuration to a file on your computer.

To ensure that the present project configuration values are saved, RSLogix 5000 prompts you to upload them. Click **Yes** to upload/save.

4. Any Datalinks that were enabled in the controller and adapter during I/O configuration ([Table 4.A](#), [Table 4.B](#) or [Table 4.C](#)) must also be configured in the drive (for example, Datalink parameters 300...317 in PowerFlex 70/700 drives). Each Datalink being used must be assigned to a specific parameter in the drive or connected peripheral. If this is not done, the controller will receive or send placeholder data instead of actual drive or peripheral parameter values.
5. Place the controller in Remote Run or Run Mode.

## Limitations When Using PLC-5, SLC 500 or MicroLogix 1100/1400

Controlling I/O with explicit messages is relatively complex compared to normal implicit I/O control.

ControlLogix and CompactLogix controllers with EtherNet/IP provide the easiest and most integrated form of implicit I/O control for a PowerFlex drive. Programming software RSLogix 5000 version 16 (or later) for ControlLogix and CompactLogix controllers contains Drive Add-On Profiles for PowerFlex drives that, with a few clicks of the mouse, automatically create all controller tags and an implicit connection at the specified Requested Packet Interval to control the drive. This connection is monitored at both ends to ensure that the controller and drive are communicating. A watchdog will cause a drive fault if the drive does not respond within approximately 100 milliseconds. Therefore, using a ControlLogix or CompactLogix controller is by far the much preferred method of controlling drives on EtherNet/IP.

If you are not using either of these type of controllers, then PowerFlex drives on EtherNet/IP can be controlled with explicit messages using PLC-5, SLC 500 or MicroLogix 1100/1400 controllers with the following limitations:

- An explicit message is a much slower form of control and is non-deterministic. This means that you cannot guarantee how long the drive will take to start up or stop when the command is given. Therefore, all equipment used in this manner should be subject to a risk assessment, taking into account the mechanical and electrical implementation.
- A timeout value (in seconds) in the adapter will issue a drive fault if a message is not received from the controller within the specified time. However, the controller has no way of detecting a loss of communications to the drive until the next cycle of explicit messages. This is another factor in the risk assessment.
- Any additional drives to be controlled will require additional explicit messages for their control, and they need to be carefully sequenced. Most controllers have small communication queues (refer to its User Manual), which need to be carefully managed if messages are not to be lost.
- Each controller has a limited number of communication connections (refer to its User Manual for maximum connections), which will limit the number of drives that can be connected.

In summary, unlike a ControlLogix or CompactLogix controller, programming a PLC-5, SLC 500 or MicroLogix 1100/1400 controller using RSLogix 5 or RSLogix 500 software with explicit messages is more difficult, and produces a more complex program.

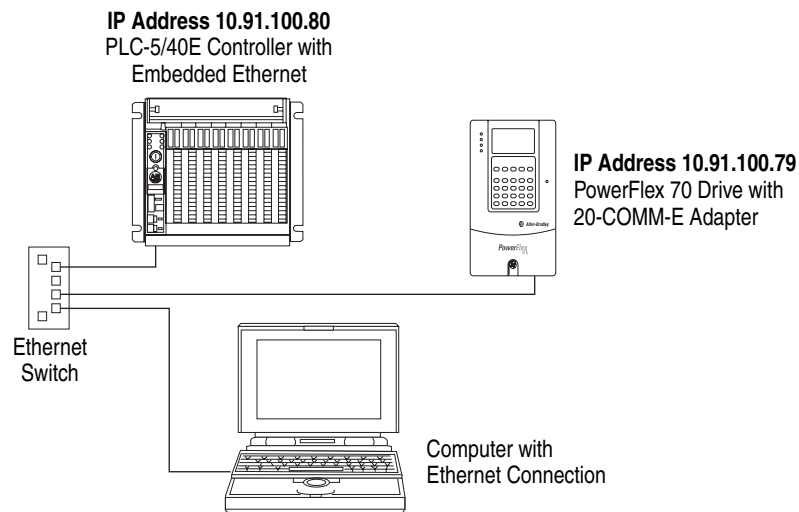
## PLC-5 Example

**Important:** The PLC-5 must be Series E (Rev. D.1 or higher) to support the MultiHop feature that routes messaging to the drive.

### Example Network

After the adapter is configured, the connected drive and adapter will be a single node on the network. This section provides the steps needed to configure a simple EtherNet/IP network (see [Figure 4.24](#)). In our example, we will configure a PLC-5/40E controller to communicate with a drive using Logic Command/Status, Reference/Feedback, and Datalinks over the network.

**Figure 4.24 PLC-5 Example EtherNet/IP Network**



**NOTE:** Information for PowerFlex 750-Series drives has been added to this manual where applicable.

## Configuring Parameters for Network I/O

Since the I/O for the drive is message-based, there is no need to configure any I/O inside the RSLogix 5 (version 7 or later) project until using the I/O as described in [Chapter 5](#).

However, to get the adapter to operate with the I/O created in [Chapter 5](#), you need to configure the adapter to accept the I/O and the drive to point to the appropriate Datalinks.

1. For this example, the following adapter I/O parameters are set to these values:

| Adapter Parameter No. | Setting             |
|-----------------------|---------------------|
| 23 - [DPI I/O Cfg]    | xxxx xxxx xxx1 1111 |
| 35 - [M-S Input]      | xxxx xxxx xxx1 1111 |
| 36 - [M-S Output]     | xxxx xxxx xxx1 1111 |

2. Reset the adapter (see [Resetting the Adapter on page 3-17](#)) or power cycle the drive.

For the drive speed reference and Datalink parameter values and the adapter setup parameter values, refer to [Drive and Adapter Parameter Settings on page 5-18](#).

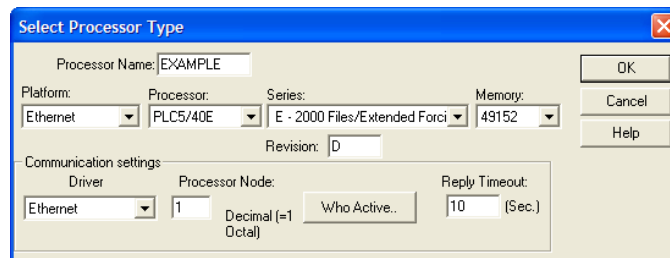
## Creating RSLogix 5 (version 7 or later) Project

To transmit (read and write) data between the controller and drive, you must create message instructions that allocate data table addresses in the controller for Logic Command/Status, Reference/Feedback, and Datalinks.

### Selecting the Controller

1. Start RSLogix 5. The RSLogix 5 window appears. Select **File > New** to display the Select Processor Type screen ([Figure 4.25](#)).

**Figure 4.25 PLC-5 Select Processor Type Screen**



2. Assign a name for the processor. From the pull-down fields, select the appropriate choices to match your PLC-5 controller and application, and click **OK**. The RSLogix 5 project window appears.

## Creating PLC-5 Ladder Logic for the Control Timeout

1. In the RSLogix 5 project window treeview under Program Files double-click on LAD 2.
2. Insert a ladder rung, double-click on the rung to display the rung editor, and enter **MSG MGxx:n**, where:

xx is an unused data file number (for example, MG10:n), and  
n is an unused element of the data file chosen for xx (for example, MG10:0)

Then press **Enter**.

3. Insert another separate rung, double-click on the rung to display the rung editor, and enter **BST XIC MGxx:n/DN NXB XIC MGxx:n/ER BND OTU MGxx:n/EN**, where:

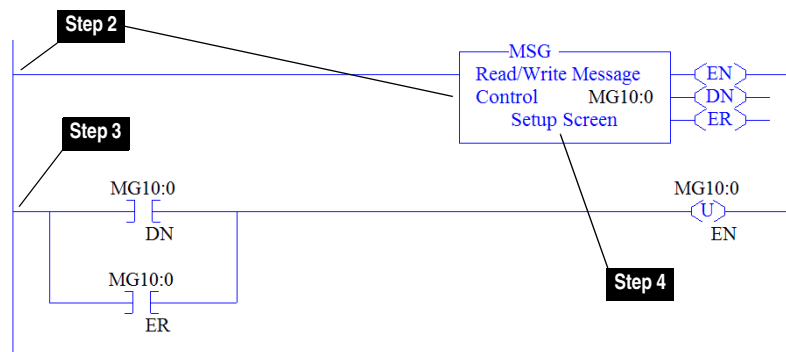
xx and n must correspond to the assigned data file number and element (for example, MG10:0) for the message created in Step 2.

**Important:** The information must be entered with appropriate numbers for “xx” and “n” for your application, and with spaces and forward slashes exactly as shown.

Then press **Enter**.

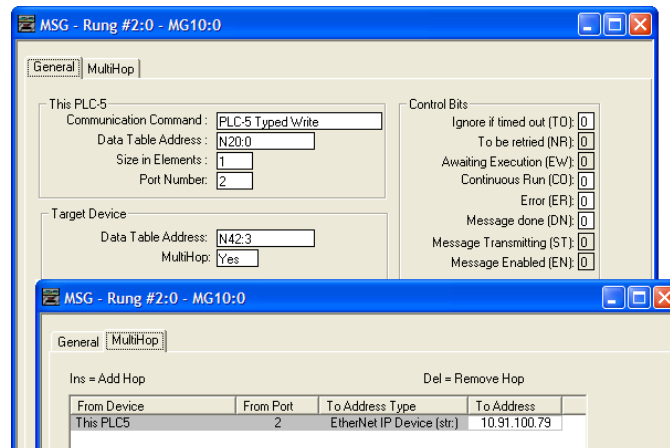
4. In the MSG instruction, double-click on Setup Screen to launch the message configuration screen ([Figure 4.27](#)).

**Figure 4.26 PLC-5 Ladder Logic for the Control Timeout**



5. Configure the General tab by entering or verifying the information shown in the screen.

Figure 4.27 PLC-5 Message Configuration Screens for the Control Timeout



| General Tab Box                        | Setting                                                                                                                                                                             |
|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| This PLC-5                             |                                                                                                                                                                                     |
| Communication Command                  | <b>PLC-5 Typed Write.</b> The controller type and command type for the controller to write the control timeout value to the drive.                                                  |
| Data Table Address <sup>(1)</sup>      | <b>N20:0.</b> An unused controller data table address containing the control timeout value to be written.                                                                           |
| Size in Elements <sup>(2)</sup>        | <b>1.</b> Number of elements (words) to be transferred. Each element size is a 16-bit integer.                                                                                      |
| Port Number                            | <b>2.</b> Controller port to which the network is connected.                                                                                                                        |
| Target Device (data for adapter/drive) |                                                                                                                                                                                     |
| Data Table Address <sup>(3)</sup>      | <b>N42:3.</b> Specific starting address of the destination file in the drive.                                                                                                       |
| MultiHop                               | <b>Yes.</b> Enables communication to allow network messaging to be routed to the adapter/drive. When "Yes" is selected, a MultiHop tab appears on the message configuration screen. |
| MultiHop Tab Box                       |                                                                                                                                                                                     |
| Setting                                |                                                                                                                                                                                     |
| To Address                             | <b>10.91.100.79.</b> The IP address of the adapter connected to the drive.                                                                                                          |

<sup>(1)</sup> For details on data table addresses for this example project, refer to [Table 5.G...](#)[Table 5.J](#) starting on [page 5-20](#).

<sup>(2)</sup> For details to determine element size for a specific drive, refer to [Understanding Controller Data Table Addresses on page 5-19](#).

<sup>(3)</sup> For details on setting the control timeout value and its function, see [N-Files on page C-10](#). The Control Timeout (N42:3) is stored in RAM. If the 20-COMM-E adapter is power cycled, the Control Timeout Message must be re-sent. If the Control Timeout is not changed from a non-zero value, the control message ([page 4-28](#)) will error out.



**TIP:** The Control Timeout (N42:3) must be changed to a non-zero value (5...20 seconds recommended). If the Control Timeout is not changed from a non-zero value, the control message ([page 4-28](#)) will error out. The Control Timeout is stored in RAM. If the adapter is power cycled, the Control Timeout Message must be re-sent.

## Creating PLC-5 Ladder Logic for the Logic Status, Feedback, and Datalink Out

1. Insert another separate rung, double-click on the rung to display the rung editor, and enter **MSG MGxx:n**, where:

xx is an unused data file number (for example, MG11:n), and  
n is an unused element of the data file chosen for xx (for example, MG11:0)

Then press **Enter**.

2. Insert another separate rung, double-click on the rung to display the rung editor, and enter **BST XIC MGxx:n/DN NXB XIC MGxx:n/ER BND OTU MGxx:n/EN**, where:

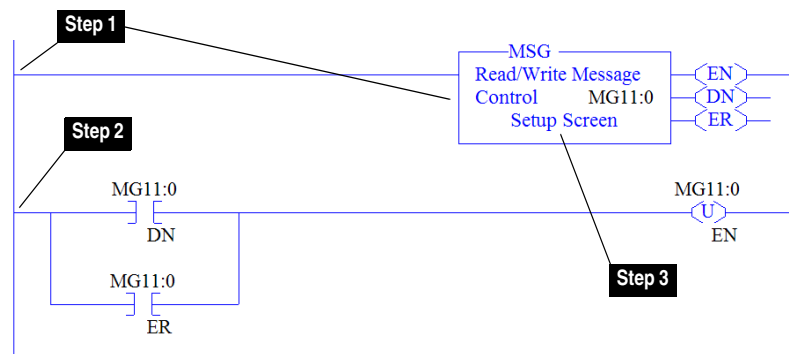
xx and n must correspond to the assigned data file number and element (for example, MG11:0) for the message created in Step 1.

**Important:** The information must be entered with appropriate numbers for “xx” and “n” for your application, and with spaces and forward slashes exactly as shown.

Then press **Enter**.

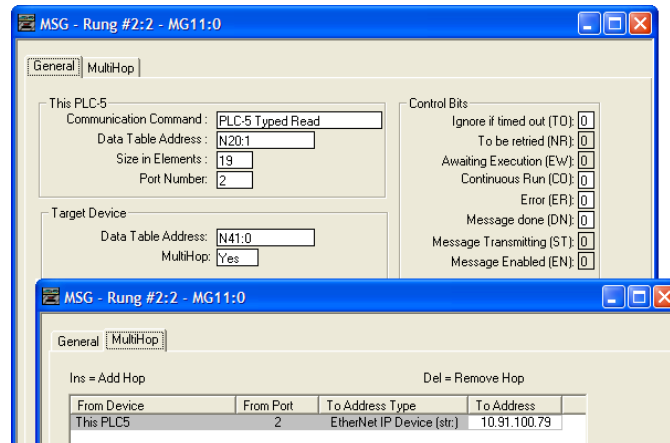
3. In the MSG instruction, double-click on Setup Screen to launch the message configuration screen ([Figure 4.29](#)).

**Figure 4.28 PLC-5 Ladder Logic for the Logic Status, Feedback, and Datalink Out**



4. Configure the General tab by entering or verifying the information shown in the screen.

**Figure 4.29 PLC-5 Message Configuration Screens for the Logic Status, Feedback, and Datalink Out**



| General Tab Box                               | Setting                                                                                                                                                                             |
|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>This PLC-5</b>                             |                                                                                                                                                                                     |
| Communication Command                         | <b>PLC-5 Typed Read.</b> The controller type and command type for the controller to read data from the drive.                                                                       |
| Data Table Address <sup>(1)</sup>             | <b>N20:1.</b> An unused controller data table address containing the data to be read from the drive.                                                                                |
| Size in Elements <sup>(2)</sup>               | <b>19.</b> Number of elements (words) to be transferred. Each element size is a 16-bit integer.                                                                                     |
| Port Number                                   | <b>2.</b> Controller port to which the network is connected.                                                                                                                        |
| <b>Target Device (data for adapter/drive)</b> |                                                                                                                                                                                     |
| Data Table Address <sup>(3)</sup>             | <b>N41:0.</b> Specific starting address of the source file in the drive.                                                                                                            |
| MultiHop                                      | <b>Yes.</b> Enables communication to allow network messaging to be routed to the adapter/drive. When “Yes” is selected, a MultiHop tab appears on the message configuration screen. |
| <b>MultiHop Tab Box</b>                       |                                                                                                                                                                                     |
| <b>Setting</b>                                |                                                                                                                                                                                     |
| To Address                                    | <b>10.91.100.79.</b> The IP address of the adapter connected to the drive.                                                                                                          |

<sup>(1)</sup> For details on data table addresses for this example project, refer to [Table 5.G...Table 5.J](#) starting on [page 5-20](#).

<sup>(2)</sup> For details to determine element size for a specific drive, refer to [Understanding Controller Data Table Addresses on page 5-19](#).

<sup>(3)</sup> For N-File details, see [N-Files on page C-10](#).

## Creating PLC-5 Ladder Logic for the Logic Command, Reference, and Datalink In

1. Insert another separate rung, double-click on the rung to display the rung editor, and enter **MSG MGxx:n**, where:

xx is an unused data file number (for example, MG12:n), and  
n is an unused element of the data file chosen for xx (for example, MG12:0)

Then press **Enter**.

2. Insert another separate rung, double-click on the rung to display the rung editor, and enter **BST XIC MGxx:n/DN NXB XIC MGxx:n/ER BND OTU MGxx:n/EN**, where:

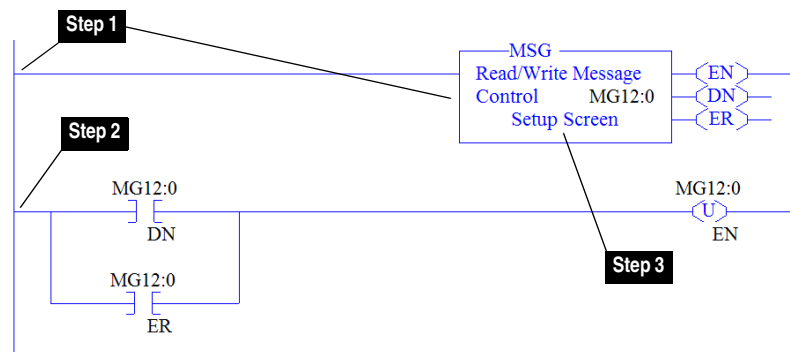
xx and n must correspond to the assigned data file number and element (for example, MG12:0) for the message created in Step 1.

**Important:** The information must be entered with appropriate numbers for “xx” and “n” for your application, and with spaces and forward slashes exactly as shown.

Then press **Enter**.

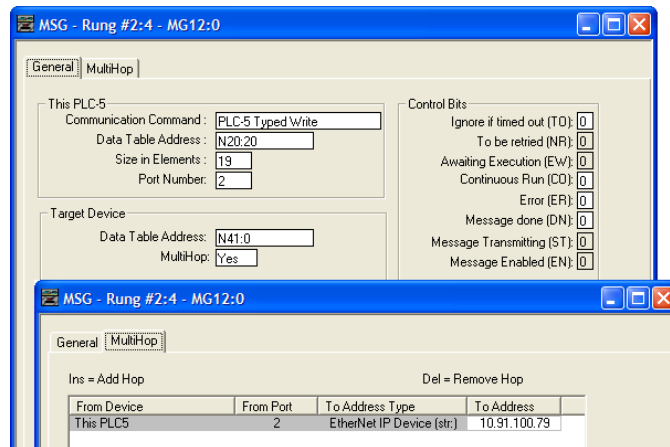
3. In the MSG instruction, double-click on Setup Screen to launch the message configuration screen ([Figure 4.31](#)).

**Figure 4.30 PLC-5 Ladder Logic for the Logic Command, Reference, and Datalink In**



4. Configure the General tab by entering or verifying the information shown in the screen.

**Figure 4.31 PLC-5 Message Configuration Screens for the Logic Command, Reference, and Datalink In**



| General Tab Box                        | Setting                                                                                                                                                                             |
|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| This PLC-5                             |                                                                                                                                                                                     |
| Communication Command                  | <b>PLC-5 Typed Write.</b> The controller type and command type for the controller to write data to the drive.                                                                       |
| Data Table Address <sup>(1)</sup>      | <b>N20:20.</b> An unused controller data table address containing the data to be written to the drive.                                                                              |
| Size in Elements <sup>(2)</sup>        | <b>19.</b> Number of elements (words) to be transferred. Each element size is a 16-bit integer.                                                                                     |
| Port Number                            | <b>2.</b> Controller port to which the network is connected.                                                                                                                        |
| Target Device (data for adapter/drive) |                                                                                                                                                                                     |
| Data Table Address <sup>(3)</sup>      | <b>N41:0.</b> Specific starting address of the destination file in the drive.                                                                                                       |
| MultiHop                               | <b>Yes.</b> Enables communication to allow network messaging to be routed to the adapter/drive. When "Yes" is selected, a MultiHop tab appears on the message configuration screen. |
| MultiHop Tab Box                       | Setting                                                                                                                                                                             |
| To Address                             | <b>10.91.100.79.</b> The IP address of the adapter connected to the drive.                                                                                                          |

<sup>(1)</sup> For details on data table addresses for this example project, refer to [Table 5.G...](#) [Table 5.J](#) starting on [page 5-20](#).

<sup>(2)</sup> For details to determine element size for a specific drive, refer to [Understanding Controller Data Table Addresses on page 5-19](#).

<sup>(3)</sup> For N-File details, see [N-Files on page C-10](#).

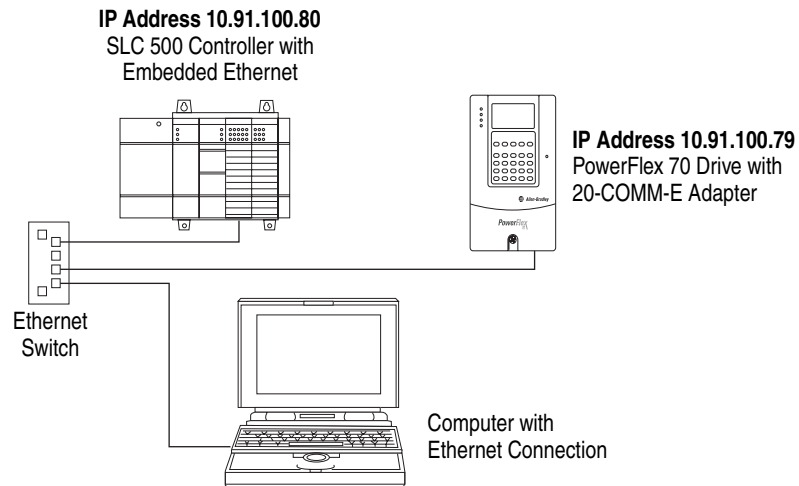
- **TIP:** This message will error out if the Control Timeout value is not changed from a non-zero value. Refer to [page 4-24](#) for writing a value to the Control Timeout.
- **TIP:** If the controller is controlling more than one drive, it is recommended to intersperse the control I/O messaging for each drive to conserve network bandwidth and decrease response time. That is, sequence the message instructions for each drive so that its group of messages will occur at a different time than those for another drive.

## SLC 500 Example

### Example Network

After the adapter is configured, the connected drive and adapter will be a single node on the network. This section provides the steps needed to configure a simple EtherNet/IP network (see [Figure 4.32](#)). In our example, we will configure a SLC 500 controller to communicate with a drive using Logic Command/Status, Reference/Feedback, and Datalinks over the network.

**Figure 4.32 SLC 500 Example EtherNet/IP Network**



**NOTE:** Information for PowerFlex 750-Series drives has been added to this manual where applicable.

## Configuring Parameters for Network I/O

Since the I/O for the drive is message-based, there is no need to configure any I/O inside the RSLogix 500 (version 7 or later) project until using the I/O as described in [Chapter 5](#).

However, to get the adapter to operate with the I/O created in [Chapter 5](#), we need to configure the adapter to accept the I/O and drive to point to the appropriate Datalinks.

1. For this example, the following adapter I/O parameters are set to these values:

| Adapter Parameter No. | Setting             |
|-----------------------|---------------------|
| 23 - [DPI I/O Cfg]    | xxxx xxxx xxx1 1111 |
| 35 - [M-S Input]      | xxxx xxxx xxx1 1111 |
| 36 - [M-S Output]     | xxxx xxxx xxx1 1111 |

2. Reset the adapter (see [Resetting the Adapter on page 3-17](#)) or power cycle the drive.

For the drive speed reference and Datalink parameter values and the adapter setup parameter values, refer to [Drive and Adapter Parameter Settings on page 5-18](#).

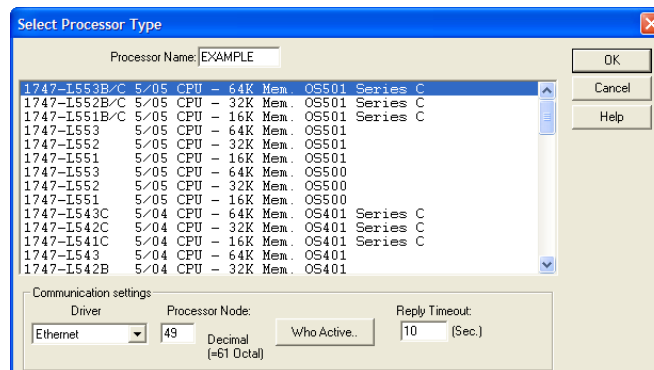
## Creating RSLogix 500 (version 7 or later) Project

To transmit (read and write) data between the controller and drive, you must create message instructions that allocate data table addresses in the controller for Logic Command/Status, Reference/Feedback, and Datalinks.

### Selecting the Controller

1. Start RSLogix 500. The RSLogix 500 window appears. Select **File > New** to display the Select Processor Type screen ([Figure 4.33](#)).

**Figure 4.33 SLC 500 Select Processor Type Screen**



2. Assign a name for the processor. In the list, select a 1747-L55x type controller. Then select the appropriate choices for the fields in the screen to match your application, and click **OK**. The RSLogix 500 project window appears.

## Creating SLC 500 Ladder Logic for the Control Timeout

1. In the RSLogix 500 project window treeview under Program Files double-click on LAD 2.
2. Insert a ladder rung, double-click on the rung to display the rung editor, and enter **MSG WRITE 500CPU LOCAL Nxx:n**, where:

xx is an unused data file number (for example, N10:n), and  
n is an unused element of the data file chosen for xx (for example, N10:0)

Then press **Enter**.

3. Insert another separate rung, double-click on the rung to display the rung editor, and enter **BST XIC Nxx:n/DN NXB XIC Nxx:n/ER BND OTU Nxx:n/EN**, where:

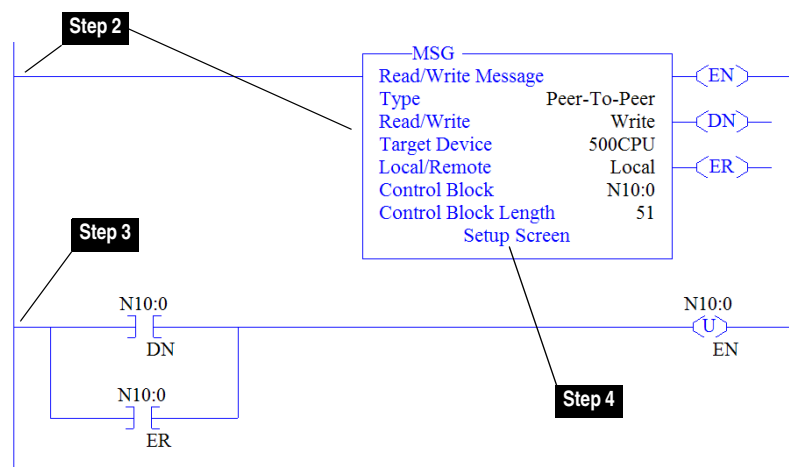
xx and n must correspond to the assigned data file number and element (for example, N10:0) for the message created in Step 2.

**Important:** The information must be entered with appropriate numbers for “xx” and “n” for your application, and with spaces and forward slashes exactly as shown.

Then press **Enter**.

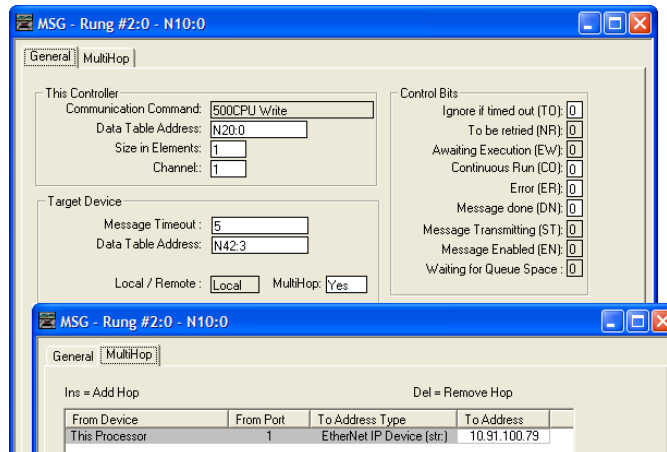
4. In the MSG instruction, double-click on Setup Screen to launch the message configuration screen ([Figure 4.35](#)).

**Figure 4.34 SLC 500 Ladder Logic for the Control Timeout**



5. Configure the General tab by entering or verifying the information shown in the screen.

Figure 4.35 SLC 500 Message Configuration Screens for the Control Timeout



| General Tab Box                        | Setting                                                                                                                                                                             |
|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| This Controller                        |                                                                                                                                                                                     |
| Communication Command                  | This setting is unavailable (grayed out) and is established when the message is created in the ladder rung.                                                                         |
| Data Table Address <sup>(1)</sup>      | <b>N20:0.</b> An unused controller data table address containing the control timeout value to be written.                                                                           |
| Size in Elements <sup>(2)</sup>        | <b>1.</b> Number of elements (words) to be transferred. Each element size is a 16-bit integer.                                                                                      |
| Channel                                | <b>1.</b> Controller port to which the network is connected.                                                                                                                        |
| Target Device (data for adapter/drive) |                                                                                                                                                                                     |
| Message Timeout                        | <b>5.</b> Message timeout duration in seconds.                                                                                                                                      |
| Data Table Address <sup>(3)</sup>      | <b>N42:3.</b> Specific starting address of the destination file in the drive.                                                                                                       |
| MultiHop                               | <b>Yes.</b> Enables communication to allow network messaging to be routed to the adapter/drive. When “Yes” is selected, a MultiHop tab appears on the message configuration screen. |
| MultiHop Tab Box                       | Setting                                                                                                                                                                             |
| To Address                             | <b>10.91.100.79.</b> The IP address of the adapter connected to the drive.                                                                                                          |

<sup>(1)</sup> For details on data table addresses for this example project, refer to [Table 5.G...Table 5.J](#) starting on [page 5-20](#).

<sup>(2)</sup> For details to determine element size for a specific drive, refer to [Understanding Controller Data Table Addresses on page 5-19](#).

<sup>(3)</sup> For details on setting the control timeout value and its function, see [N-Files on page C-10](#). The Control Timeout (N42:3) is stored in RAM. If the 20-COMM-E adapter is power cycled, the Control Timeout Message must be re-sent. If the Control Timeout is not changed from a non-zero value, the control message ([page 4-36](#)) will error out.



**TIP:** The Control Timeout (N42:3) must be changed to a non-zero value (5...20 seconds recommended). If the Control Timeout is not changed from a non-zero value, the control message ([page 4-36](#)) will error out. The Control Timeout is stored in RAM. If the adapter is power cycled, the Control Timeout Message must be re-sent.

## Creating SLC 500 Ladder Logic for the Logic Status, Feedback, and Datalink Out

1. Insert another separate rung, double-click on the rung to display the rung editor, and enter **MSG READ 500CPU LOCAL Nxx:n**, where:

xx is an unused data file number (for example, N11:n), and  
n is an unused element of the data file chosen for xx (for example, N11:0)

Then press **Enter**.

2. Insert another separate rung, double-click on the rung to display the rung editor, and enter **BST XIC Nxx:n/DN NXB XIC Nxx:n/ER BND OTU Nxx:n/EN**, where:

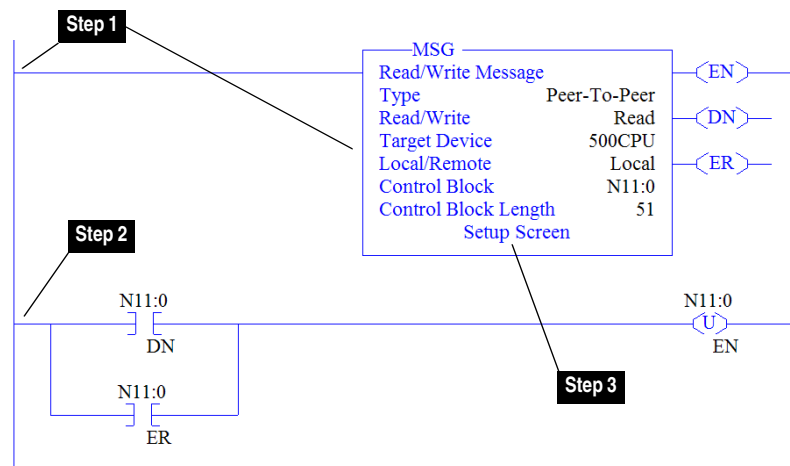
xx and n must correspond to the assigned data file number and element (for example, N11:0) for the message created in Step 1.

**Important:** The information must be entered with appropriate numbers for “xx” and “n” for your application, and with spaces and forward slashes exactly as shown.

Then press **Enter**.

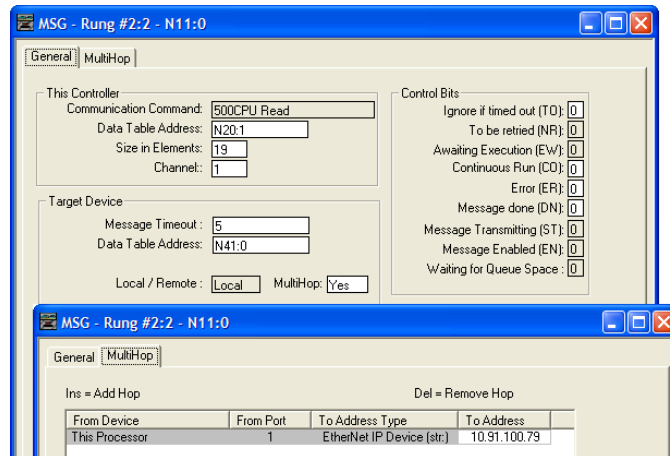
3. In the MSG instruction, double-click on Setup Screen to launch the message configuration screen ([Figure 4.37](#)).

Figure 4.36 SLC 500 Ladder Logic for the Logic Status, Feedback, and Datalink Out



4. Configure the General tab by entering or verifying the information shown in the screen.

**Figure 4.37 SLC 500 Message Configuration Screens for the Logic Status, Feedback, and Datalink Out**



| General Tab Box                        | Setting                                                                                                                                                                             |
|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| This Controller                        |                                                                                                                                                                                     |
| Communication Command                  | This setting is unavailable (grayed out) and is established when the message is created in the ladder rung.                                                                         |
| Data Table Address <sup>(1)</sup>      | <b>N20:1.</b> An unused controller data table address containing the data to be read from the drive.                                                                                |
| Size in Elements <sup>(2)</sup>        | <b>19.</b> Number of elements (words) to be transferred. Each element size is a 16-bit integer.                                                                                     |
| Channel                                | <b>1.</b> Controller port to which the network is connected.                                                                                                                        |
| Target Device (data for adapter/drive) |                                                                                                                                                                                     |
| Message Timeout                        | <b>5.</b> Message timeout duration in seconds.                                                                                                                                      |
| Data Table Address <sup>(3)</sup>      | <b>N41:0.</b> Specific starting address of the source file in the drive.                                                                                                            |
| MultiHop                               | <b>Yes.</b> Enables communication to allow network messaging to be routed to the adapter/drive. When “Yes” is selected, a MultiHop tab appears on the message configuration screen. |
| MultiHop Tab Box                       |                                                                                                                                                                                     |
| Setting                                |                                                                                                                                                                                     |
| To Address                             | <b>10.91.100.79.</b> The IP address of the adapter connected to the drive.                                                                                                          |

<sup>(1)</sup> For details on data table addresses for this example project, refer to [Table 5.G...Table 5.J](#) starting on [page 5-20](#).

<sup>(2)</sup> For details to determine element size for a specific drive, refer to [Understanding Controller Data Table Addresses on page 5-19](#).

<sup>(3)</sup> For N-File details, see [N-Files on page C-10](#).

## Creating SLC 500 Ladder Logic for the Logic Command, Reference, and Datalink In

1. Insert another separate rung, double-click on the rung to display the rung editor, and enter **MSG WRITE 500CPU LOCAL Nxx:n**, where:

xx is an unused data file number (for example, N12:n), and  
n is an unused element of the data file chosen for xx (for example, N12:0)

Then press **Enter**.

2. Insert another separate rung, double-click on the rung to display the rung editor, and enter **BST XIC Nxx:n/DN NXB XIC Nxx:n/ER BND OTU Nxx:n/EN**, where:

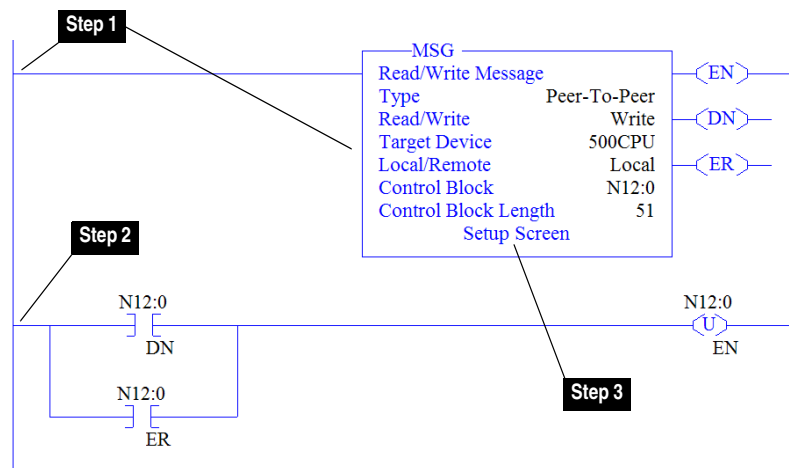
xx and n must correspond to the assigned data file number and element (for example, N12:0) for the message created in Step 1.

**Important:** The information must be entered with appropriate numbers for “xx” and “n” for your application, and with spaces and forward slashes exactly as shown.

Then press **Enter**.

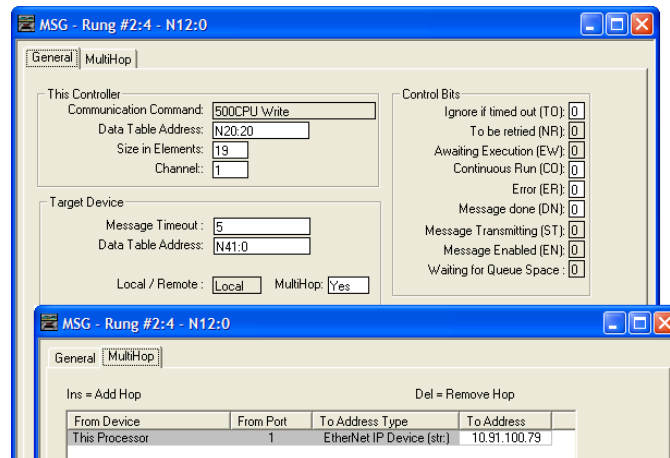
3. In the MSG instruction, double-click on Setup Screen to launch the message configuration screen ([Figure 4.39](#)).

**Figure 4.38 SLC 500 Ladder Logic for the Logic Command, Reference, and Datalink In**



4. Configure the General tab by entering or verifying the information shown in the screen.

**Figure 4.39 SLC 500 Message Configuration Screens for the Logic Command, Reference, and Datalink In**



| General Tab Box                               | Setting                                                                                                                                                                             |
|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>This Controller</b>                        |                                                                                                                                                                                     |
| Communication Command                         | This setting is unavailable (grayed out) and is established when the message is created in the ladder rung.                                                                         |
| Data Table Address <sup>(1)</sup>             | <b>N20:20.</b> An unused controller data table address containing the data to be written to the drive.                                                                              |
| Size in Elements <sup>(2)</sup>               | <b>19.</b> Number of elements (words) to be transferred. Each element size is a 16-bit integer.                                                                                     |
| Channel                                       | <b>1.</b> Controller port to which the network is connected.                                                                                                                        |
| <b>Target Device (data for adapter/drive)</b> |                                                                                                                                                                                     |
| Message Timeout                               | <b>5.</b> Message timeout duration in seconds.                                                                                                                                      |
| Data Table Address <sup>(3)</sup>             | <b>N41:0.</b> Specific starting address of the destination file in the drive.                                                                                                       |
| MultiHop                                      | <b>Yes.</b> Enables communication to allow network messaging to be routed to the adapter/drive. When “Yes” is selected, a MultiHop tab appears on the message configuration screen. |
| <b>MultiHop Tab Box</b>                       |                                                                                                                                                                                     |
| To Address                                    | <b>10.91.100.79.</b> The IP address of the adapter connected to the drive.                                                                                                          |

<sup>(1)</sup> For details on data table addresses for this example project, refer to [Table 5.G...Table 5.J](#) starting on [page 5-20](#).

<sup>(2)</sup> For details to determine element size for a specific drive, refer to [Understanding Controller Data Table Addresses on page 5-19](#).

<sup>(3)</sup> For N-File details, see [N-Files on page C-10](#).

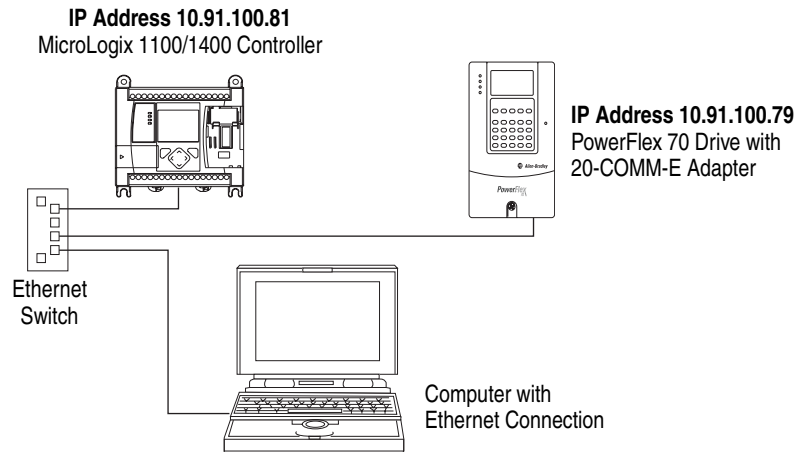
- **TIP:** This message will error out if the [Control Timeout](#) value is not changed from a non-zero value. Refer to [page 4-32](#) for writing a value to the Control Timeout.
- **TIP:** If the controller is controlling more than one drive, it is recommended to intersperse the control I/O messaging for each drive to conserve network bandwidth and decrease response time. That is, sequence the message instructions for each drive so that its group of messages will occur at a different time than those for another drive.

## MicroLogix 1100/1400 Example

### Example Network

After the adapter is configured, the connected drive and adapter will be a single node on the network. This section provides the steps needed to configure a simple EtherNet/IP network (see [Figure 4.40](#)). In our example, we will configure a MicroLogix 1100 controller to communicate with a drive using Logic Command/Status, Reference/Feedback, and Datalinks over the network.

**Figure 4.40 MicroLogix 1100/1400 Example EtherNet/IP Network**



**NOTE:** Information for PowerFlex 750-Series drives has been added to this manual where applicable.

## Configuring Parameters for Network I/O

Since the I/O for the drive is message-based, there is no need to configure any I/O inside the RSLogix 500 (version 7 or later) project until using the I/O as described in [Chapter 5](#).

However, to get the adapter to operate with the I/O created in [Chapter 5](#), we need to configure the adapter to accept the I/O and drive to point to the appropriate Datalinks.

1. For this example, the following adapter I/O parameters are set to these values:

| Adapter Parameter No. | Setting             |
|-----------------------|---------------------|
| 23 - [DPI I/O Cfg]    | xxxx xxxx xxx1 1111 |
| 35 - [M-S Input]      | xxxx xxxx xxx1 1111 |
| 36 - [M-S Output]     | xxxx xxxx xxx1 1111 |

2. Reset the adapter (see [Resetting the Adapter on page 3-17](#)) or power cycle the drive.

For the drive speed reference and Datalink parameter values and the adapter setup parameter values, refer to [Drive and Adapter Parameter Settings on page 5-18](#).

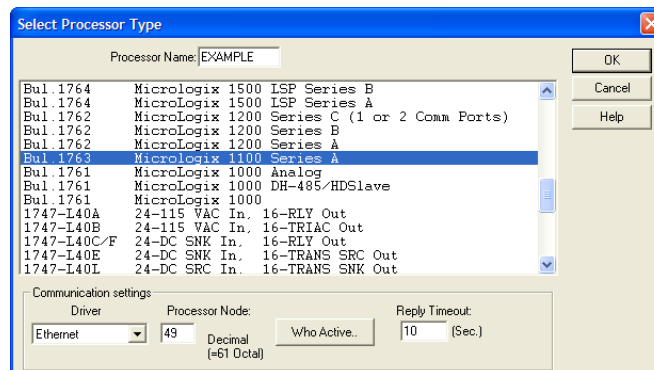
## Creating RSLogix 500 (version 7 or later) Project

To transmit (read and write) data between the controller and drive, you must create message instructions that allocate data table addresses in the controller for Logic Command/Status, Reference/Feedback, and Datalinks.

### Selecting the Controller

1. Start RSLogix 500. The RSLogix 500 window appears. Select **File > New** to display the Select Processor Type screen ([Figure 4.41](#)).

**Figure 4.41 MicroLogix 1100 Select Processor Type Screen**



2. Assign a name for the processor. In the list, select the MicroLogix 1100. Then select the appropriate choices for the fields in the screen to match your application, and click **OK**. The RSLogix 500 project window appears.

## Creating MicroLogix 1100/1400 Ladder Logic for the Control Timeout

1. In the RSLogix 500 project window treeview under Program Files double-click on LAD 2.
2. Insert a ladder rung, double-click on the rung to display the rung editor, and enter **MSG MGxx:n**, where:

xx is an unused data file number (for example, MG10:n), and  
n is an unused element of the data file chosen for xx (for example, MG10:0)

Then press **Enter**.

3. Insert another separate rung, double-click on the rung to display the rung editor, and enter **BST XIC MGxx:n/DN NXB XIC MGxx:n/ER BND OTU MGxx:n/EN**, where:

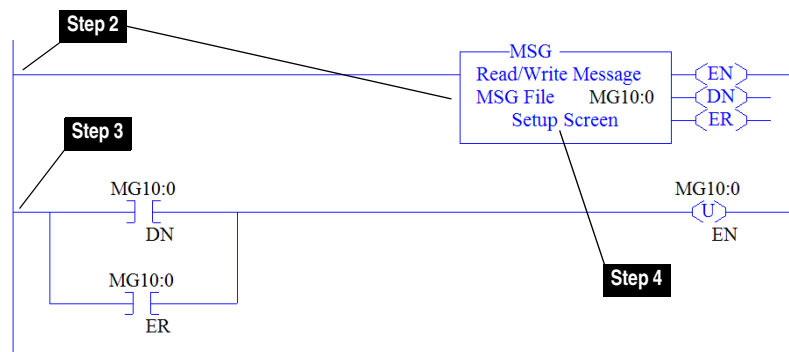
xx and n must correspond to the assigned data file number and element (for example, MG10:0) for the message created in Step 2.

**Important:** The information must be entered with appropriate numbers for “xx” and “n” for your application, and with spaces and forward slashes exactly as shown.

Then press **Enter**.

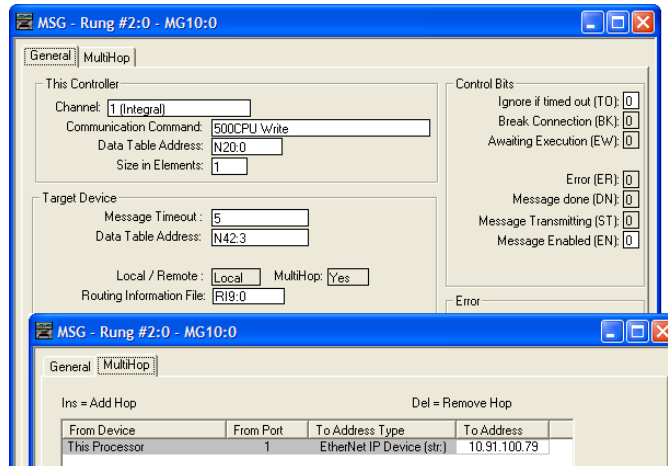
4. In the MSG instruction, double-click on Setup Screen to launch the message configuration screen ([Figure 4.43](#)).

**Figure 4.42 MicroLogix 1100/1400 Ladder Logic for the Control Timeout**



5. Configure the General tab by entering or verifying the information shown in the screen.

**Figure 4.43 MicroLogix 1100/1400 Message Configuration Screens for the Control Timeout**



| General Tab Box                            | Setting                                                                                                                                                                                                                                                                                                    |
|--------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| This Controller (data for MicroLogix 1100) |                                                                                                                                                                                                                                                                                                            |
| Channel                                    | <b>1 (integral)</b> . Controller port to which the network is connected.                                                                                                                                                                                                                                   |
| Communication Command                      | <b>500CPU Write</b> . The controller type and command type for the controller to read or write data. Since the MicroLogix 1100 is part of the SLC-500 controller family, the "500CPU" controller type was selected. The "Write" command type was selected to write the control timeout value to the drive. |
| Data Table Address <sup>(1)</sup>          | <b>N20:0</b> . An unused controller data table address containing the control timeout value to be written.                                                                                                                                                                                                 |
| Size in Elements <sup>(2)</sup>            | <b>1</b> . Number of elements (words) to be transferred. Each element size is a 16-bit integer.                                                                                                                                                                                                            |
| Target Device (data for adapter/drive)     |                                                                                                                                                                                                                                                                                                            |
| Message Timeout                            | <b>5</b> . Message timeout duration in seconds.                                                                                                                                                                                                                                                            |
| Data Table Address <sup>(3)</sup>          | <b>N42:3</b> . Specific starting address of the destination file in the drive.                                                                                                                                                                                                                             |
| Routing Information File                   | <b>R19:0</b> . An unused routing information file for the controller.                                                                                                                                                                                                                                      |
| MultiHop Tab Box                           |                                                                                                                                                                                                                                                                                                            |
| Setting                                    |                                                                                                                                                                                                                                                                                                            |
| To Address                                 | <b>10.91.100.79</b> . The IP address of the adapter connected to the drive.                                                                                                                                                                                                                                |

<sup>(1)</sup> For details on data table addresses for this example project, refer to [Table 5.G...Table 5.J](#) starting on [page 5-20](#).

<sup>(2)</sup> For details to determine element size for a specific drive, refer to [Understanding Controller Data Table Addresses on page 5-19](#).

<sup>(3)</sup> For details on setting the control timeout value and its function, see [N-Files on page C-10](#). The Control Timeout (N42:3) is stored in RAM. If the 20-COMM-E adapter is power cycled, the Control Timeout Message must be re-sent. If the Control Timeout is not changed from a non-zero value, the control message ([page 4-44](#)) will error out.



**TIP:** The Control Timeout (N42:3) must be changed to a non-zero value (5...20 seconds recommended). If the Control Timeout is not changed from a non-zero value, the control message ([page 4-44](#)) will error out. The Control Timeout is stored in RAM. If the adapter is power cycled, the Control Timeout Message must be re-sent.

### Creating MicroLogix 1100/1400 Ladder Logic for the Logic Status, Feedback, and Datalink Out

1. Insert another separate rung, double-click on the rung to display the rung editor, and enter **MSG MGxx:n**, where:

xx is an unused data file number (for example, MG11:n), and  
n is an unused element of the data file chosen for xx (for example, MG11:0)

Then press **Enter**.

2. Insert another separate rung, double-click on the rung to display the rung editor, and enter **BST XIC MGxx:n/DN NXB XIC MGxx:n/ER BND OTU MGxx:n/EN**, where:

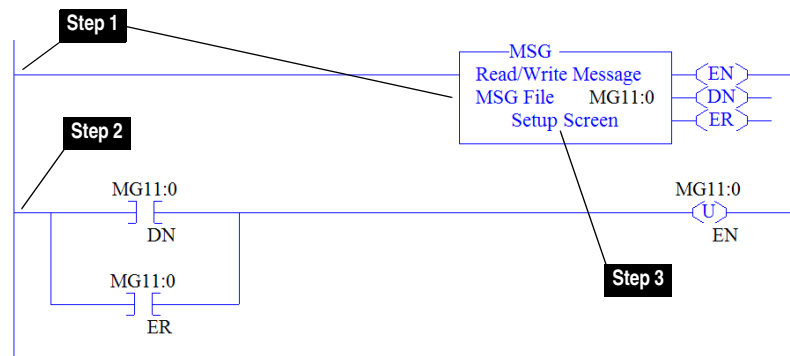
xx and n must correspond to the assigned data file number and element (for example, MG11:0) for the message created in Step 1.

**Important:** The information must be entered with appropriate numbers for “xx” and “n” for your application, and with spaces and forward slashes exactly as shown.

Then press **Enter**.

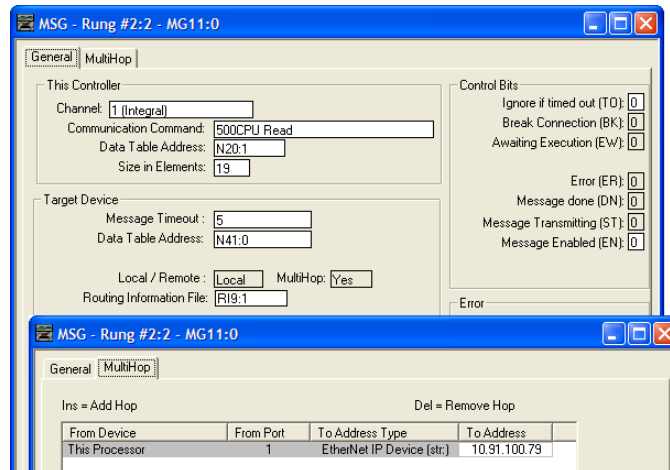
3. In the MSG instruction, double-click on Setup Screen to launch the message configuration screen ([Figure 4.45](#)).

**Figure 4.44** MicroLogix 1100/1400 Ladder Logic for the Logic Status, Feedback, and Datalink Out



4. Configure the General tab by entering or verifying the information shown in the screen.

**Figure 4.45 MicroLogix 1100/1400 Message Configuration Screens for the Logic Status, Feedback, and Datalink Out**



| General Tab Box                            | Setting                                                                                                                                                                                                                                                                             |
|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| This Controller (data for MicroLogix 1100) |                                                                                                                                                                                                                                                                                     |
| Channel                                    | <b>1 (integral).</b> Controller port to which the network is connected.                                                                                                                                                                                                             |
| Communication Command                      | <b>500CPU Read.</b> The controller type and command type for the controller to read or write data. Since the MicroLogix 1100 is part of the SLC-500 controller family, the “500CPU” controller type was selected. The “Read” command type was selected to read data from the drive. |
| Data Table Address <sup>(1)</sup>          | <b>N20:1.</b> An unused controller data table address containing the data to be read from the drive.                                                                                                                                                                                |
| Size in Elements <sup>(2)</sup>            | <b>19.</b> Number of elements (words) to be transferred. Each element size is a 16-bit integer.                                                                                                                                                                                     |
| Target Device (data for adapter/drive)     |                                                                                                                                                                                                                                                                                     |
| Message Timeout                            | <b>5.</b> Message timeout duration in seconds.                                                                                                                                                                                                                                      |
| Data Table Address <sup>(3)</sup>          | <b>N41:0.</b> Specific starting address of the source file in the drive.                                                                                                                                                                                                            |
| Routing Information File                   | <b>R19:1.</b> An unused routing information file for the controller.                                                                                                                                                                                                                |
| <b>MultiHop Tab Box</b>                    | <b>Setting</b>                                                                                                                                                                                                                                                                      |
| To Address                                 | <b>10.91.100.79.</b> The IP address of the adapter connected to the drive.                                                                                                                                                                                                          |

<sup>(1)</sup> For details on data table addresses for this example project, refer to [Table 5.G...Table 5.J](#) starting on [page 5-20](#).

<sup>(2)</sup> For details to determine element size for a specific drive, refer to [Understanding Controller Data Table Addresses on page 5-19](#).

<sup>(3)</sup> For N-File details, see [N-Files on page C-10](#).

### Creating MicroLogix 1100/1400 Ladder Logic for the Logic Command, Reference, and Datalink In

1. Insert another separate rung, double-click on the rung to display the rung editor, and enter **MSG MGxx:n**, where:

xx is an unused data file number (for example, MG12:n), and  
n is an unused element of the data file chosen for xx (for example, MG12:0)

Then press **Enter**.

2. Insert another separate rung, double-click on the rung to display the rung editor, and enter **BST XIC MGxx:n/DN NXB XIC MGxx:n/ER BND OTU MGxx:n/EN**, where:

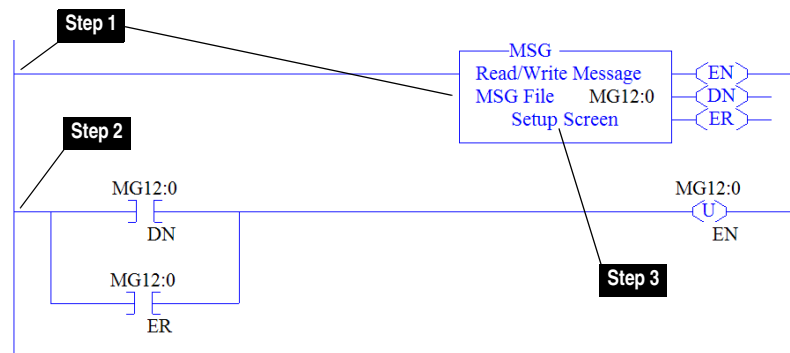
xx and n must correspond to the assigned data file number and element (for example, MG12:0) for the message created in Step 1.

**Important:** The information must be entered with appropriate numbers for “xx” and “n” for your application, and with spaces and forward slashes exactly as shown.

Then press **Enter**.

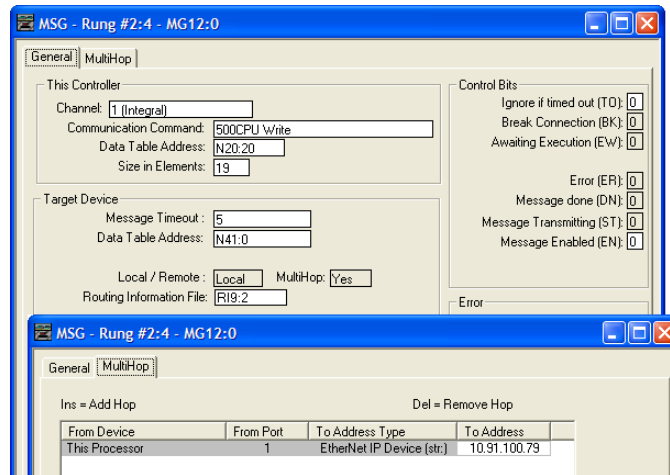
3. In the MSG instruction, double-click on Setup Screen to launch the message configuration screen ([Figure 4.47](#)).

**Figure 4.46** MicroLogix 1100/1400 Ladder Logic for the Logic Command, Reference, and Datalink In



4. Configure the General tab by entering or verifying the information shown in the screen.

**Figure 4.47 MicroLogix 1100/1400 Message Configuration Screens for the Logic Command, Reference, and Datalink In**



| General Tab Box                            | Setting                                                                                                                                                                                                                                                                              |
|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| This Controller (data for MicroLogix 1100) |                                                                                                                                                                                                                                                                                      |
| Channel                                    | <b>1 (integral).</b> Controller port to which the network is connected.                                                                                                                                                                                                              |
| Communication Command                      | <b>500CPU Write.</b> The controller type and command type for the controller to read or write data. Since the MicroLogix 1100 is part of the SLC-500 controller family, the "500CPU" controller type was selected. The "Write" command type was selected to write data to the drive. |
| Data Table Address <sup>(1)</sup>          | <b>N20:20.</b> An unused controller data table address containing the data to be written to the drive.                                                                                                                                                                               |
| Size in Elements <sup>(2)</sup>            | <b>19.</b> Number of elements (words) to be transferred. Each element size is a 16-bit integer.                                                                                                                                                                                      |
| Target Device (data for adapter/drive)     |                                                                                                                                                                                                                                                                                      |
| Message Timeout                            | <b>5.</b> Message timeout duration in seconds.                                                                                                                                                                                                                                       |
| Data Table Address <sup>(3)</sup>          | <b>N41:0.</b> Specific starting address of the destination file in the drive.                                                                                                                                                                                                        |
| Routing Information File                   | <b>R19:2.</b> An unused routing information file for the controller.                                                                                                                                                                                                                 |
| MultiHop Tab Box                           |                                                                                                                                                                                                                                                                                      |
| To Address                                 | <b>10.91.100.79.</b> The IP address of the adapter connected to the drive.                                                                                                                                                                                                           |

<sup>(1)</sup> For details on data table addresses for this example project, refer to [Table 5.G...Table 5.J](#) starting on [page 5-20](#).

<sup>(2)</sup> For details to determine element size for a specific drive, refer to [Understanding Controller Data Table Addresses on page 5-19](#).

<sup>(3)</sup> For N-File details, see [N-Files on page C-10](#).

- **TIP:** This message will error out if the Control Timeout value is not changed from a non-zero value. Refer to [page 4-40](#) for writing a value to the Control Timeout.
- **TIP:** If the controller is controlling more than one drive, it is recommended to intersperse the control I/O messaging for each drive to conserve network bandwidth and decrease response time. That is, sequence the message instructions for each drive so that its group of messages will occur at a different time than those for another drive.

## Notes:

## Using the I/O

This chapter provides information and examples that explain how to control, configure, and monitor a PowerFlex 7-Class drive using the configured I/O.

| Topic                                                          | Page                 |
|----------------------------------------------------------------|----------------------|
| <a href="#">About I/O Messaging</a>                            | <a href="#">5-1</a>  |
| <a href="#">Understanding the I/O Image</a>                    | <a href="#">5-2</a>  |
| <a href="#">Using Logic Command/Status</a>                     | <a href="#">5-5</a>  |
| <a href="#">Using Reference/Feedback</a>                       | <a href="#">5-5</a>  |
| <a href="#">Using Datalinks</a>                                | <a href="#">5-7</a>  |
| <a href="#">Example Ladder Logic Program Information</a>       | <a href="#">5-9</a>  |
| <a href="#">ControlLogix Example</a>                           | <a href="#">5-10</a> |
| <a href="#">PLC-5, SLC 500 or MicroLogix 1100/1400 Example</a> | <a href="#">5-18</a> |



**ATTENTION:** Risk of injury or equipment damage exists. The examples in this publication are intended solely for purposes of example. There are many variables and requirements with any application. Rockwell Automation, Inc. does not assume responsibility or liability (to include intellectual property liability) for actual use of the examples shown in this publication.

### About I/O Messaging

On CIP-based networks, including EtherNet/IP, I/O connections are used to transfer the data which controls the PowerFlex drive and sets its Reference. I/O can also be used to transfer data to and from Datalinks in PowerFlex 7-Class drives.

The adapter provides many options for configuring and using I/O, including:

- Configuring the size of I/O by enabling or disabling the Logic Command/Reference and Datalinks.
- Setting a Master-Slave hierarchy or a Peer-to-Peer hierarchy.

[Chapter 3, Configuring the Adapter](#), and [Chapter 4, Configuring the I/O](#), discuss how to configure the adapter and controller on the network for these options. The [Glossary](#) defines the different options. This chapter discusses how to use I/O after you have configured the adapter and controller.

**Understanding the I/O Image** The terms *input* and *output* are defined from the controller's point of view. Therefore, output I/O is data that is produced by the controller and consumed by the adapter. Input I/O is status data that is produced by the adapter and consumed as input by the controller. The I/O image will vary based on:

- Size (either 16-bit or 32-bit) of the Reference/Feedback words and Datalink words used by the drive. To determine the size of the Reference/Feedback and Datalinks, view adapter **Parameters 18 - [Ref/Fdbk Size]** and **19 - [Datalink Size]**. For information to access parameters, see [Using the PowerFlex 7-Class HIM on page 3-2](#).
- Configuration of I/O (**Parameter 23 - [DPI I/O Cfg]**). If all I/O is not enabled, the image is truncated. The image always uses consecutive words starting at word 0.
- **ControlLogix/CompactLogix Controllers only**—The drive profile used in RSLogix 5000 (drive Add-On Profile in version 16 or later, Classic Profile in versions 13...15, or Generic Profile in all versions).

### ControlLogix Controller Image

Since the drive Add-On Profile in RSLogix 5000 version 16 (or later) and the Classic Profile (versions 13...15) provide descriptive controller tags, the I/O image (tag size and location) is automatically configured based on the drive being used. When using the Generic Profile ([page 4-15](#)) in RSLogix 5000, however, controller tags are not descriptive or defined.

The ControlLogix controller I/O image changes depending on the size of the drive's Reference/Feedback and Datalinks. [Table 5.A](#), [Table 5.B](#), and [Table 5.C](#) show the I/O image when using various PowerFlex 7-Class drives, and all Datalinks enabled.

**Table 5.A ControlLogix I/O Image for PowerFlex 70/700/700H Drives and SMC Flex (16-bit Reference/Feedback and 16-bit Datalinks) – Using Generic Profile**

| Word | Output I/O     | Word | Input I/O       |
|------|----------------|------|-----------------|
| 0    | Logic Command  | 0    | Pad Word        |
| 1    | Reference      | 1    | Pad Word        |
| 2    | Datalink In A1 | 2    | Logic Status    |
| 3    | Datalink In A2 | 3    | Feedback        |
| 4    | Datalink In B1 | 4    | Datalink Out A1 |
| 5    | Datalink In B2 | 5    | Datalink Out A2 |
| 6    | Datalink In C1 | 6    | Datalink Out B1 |
| 7    | Datalink In C2 | 7    | Datalink Out B2 |
| 8    | Datalink In D1 | 8    | Datalink Out C1 |
| 9    | Datalink In D2 | 9    | Datalink Out C2 |
|      |                | 10   | Datalink Out D1 |
|      |                | 11   | Datalink Out D2 |

**Table 5.B ControlLogix I/O Image for PowerFlex 700 VC Drives  
(16-bit Reference/Feedback and 32-bit Datalinks) – Using Generic Profile**

| Word | Output I/O           | Word | Input I/O             |
|------|----------------------|------|-----------------------|
| 0    | Logic Command        | 0    | Pad Word              |
| 1    | Reference            | 1    | Pad Word              |
| 2    | Datalink In A1 (LSW) | 2    | Logic Status          |
| 3    | Datalink In A1 (MSW) | 3    | Feedback              |
| 4    | Datalink In A2 (LSW) | 4    | Datalink Out A1 (LSW) |
| 5    | Datalink In A2 (MSW) | 5    | Datalink Out A1 (MSW) |
| 6    | Datalink In B1 (LSW) | 6    | Datalink Out A2 (LSW) |
| 7    | Datalink In B1 (MSW) | 7    | Datalink Out A2 (MSW) |
| 8    | Datalink In B2 (LSW) | 8    | Datalink Out B1 (LSW) |
| 9    | Datalink In B2 (MSW) | 9    | Datalink Out B1 (MSW) |
| 10   | Datalink In C1 (LSW) | 10   | Datalink Out B2 (LSW) |
| 11   | Datalink In C1 (MSW) | 11   | Datalink Out B2 (MSW) |
| 12   | Datalink In C2 (LSW) | 12   | Datalink Out C1 (LSW) |
| 13   | Datalink In C2 (MSW) | 13   | Datalink Out C1 (MSW) |
| 14   | Datalink In D1 (LSW) | 14   | Datalink Out C2 (LSW) |
| 15   | Datalink In D1 (MSW) | 15   | Datalink Out C2 (MSW) |
| 16   | Datalink In D2 (LSW) | 16   | Datalink Out D1 (LSW) |
| 17   | Datalink In D2 (MSW) | 17   | Datalink Out D1 (MSW) |
|      |                      | 18   | Datalink Out D2 (LSW) |
|      |                      | 19   | Datalink Out D2 (MSW) |

**Table 5.C ControlLogix I/O Image for PowerFlex 700S/750-Series Drives  
(32-bit Reference/Feedback and 32-bit Datalinks) – Using Generic Profile**

| Word | Output I/O           | Word | Input I/O             |
|------|----------------------|------|-----------------------|
| 0    | Logic Command        | 0    | Pad Word              |
| 1    | Not Used             | 1    | Pad Word              |
| 2    | Reference (LSW)      | 2    | Logic Status          |
| 3    | Reference (MSW)      | 3    | Not Used              |
| 4    | Datalink In A1 (LSW) | 4    | Feedback (LSW)        |
| 5    | Datalink In A1 (MSW) | 5    | Feedback (MSW)        |
| 6    | Datalink In A2 (LSW) | 6    | Datalink Out A1 (LSW) |
| 7    | Datalink In A2 (MSW) | 7    | Datalink Out A1 (MSW) |
| 8    | Datalink In B1 (LSW) | 8    | Datalink Out A2 (LSW) |
| 9    | Datalink In B1 (MSW) | 9    | Datalink Out A2 (MSW) |
| 10   | Datalink In B2 (LSW) | 10   | Datalink Out B1 (LSW) |
| 11   | Datalink In B2 (MSW) | 11   | Datalink Out B1 (MSW) |
| 12   | Datalink In C1 (LSW) | 12   | Datalink Out B2 (LSW) |
| 13   | Datalink In C1 (MSW) | 13   | Datalink Out B2 (MSW) |
| 14   | Datalink In C2 (LSW) | 14   | Datalink Out C1 (LSW) |
| 15   | Datalink In C2 (MSW) | 15   | Datalink Out C1 (MSW) |
| 16   | Datalink In D1 (LSW) | 16   | Datalink Out C2 (LSW) |
| 17   | Datalink In D1 (MSW) | 17   | Datalink Out C2 (MSW) |
| 18   | Datalink In D2 (LSW) | 18   | Datalink Out D1 (LSW) |
| 19   | Datalink In D2 (MSW) | 19   | Datalink Out D1 (MSW) |
|      |                      | 20   | Datalink Out D2 (LSW) |
|      |                      | 21   | Datalink Out D2 (MSW) |

## PLC-5, SLC 500 or MicroLogix 1100/1400 Controller Image

The I/O image for these controllers always has 19 words of output and 19 words of input. However, depending on the size of the drive's Reference/Feedback and Datalinks, specific words in the I/O image may not be used. [Table 5.D](#), [Table 5.E](#), and [Table 5.F](#) show the I/O image when using various PowerFlex 7-Class drives, and all Datalinks enabled.

**Table 5.D PLC-5, SLC 500 or MicroLogix 1100/1400 I/O Image for PowerFlex 70/700/700H Drives and SMC Flex (16-bit Reference/Feedback and 16-bit Datalinks)**

| Word | Output I/O           | Word | Input I/O             |
|------|----------------------|------|-----------------------|
| 0    | Logic Command        | 0    | Logic Status          |
| 1    | Not used             | 1    | Not used              |
| 2    | Reference (MSW)      | 2    | Feedback (MSW)        |
| 3    | Not used             | 3    | Not used              |
| 4    | Datalink In A1 (MSW) | 4    | Datalink Out A1 (MSW) |
| 5    | Not used             | 5    | Not used              |
| 6    | Datalink In A2 (MSW) | 6    | Datalink Out A2 (MSW) |
| 7    | Not used             | 7    | Not used              |
| 8    | Datalink In B1 (MSW) | 8    | Datalink Out B1 (MSW) |
| 9    | Not used             | 9    | Not used              |
| 10   | Datalink In B2 (MSW) | 10   | Datalink Out B2 (MSW) |
| 11   | Not used             | 11   | Not used              |
| 12   | Datalink In C1 (MSW) | 12   | Datalink Out C1 (MSW) |
| 13   | Not used             | 13   | Not used              |
| 14   | Datalink In C2 (MSW) | 14   | Datalink Out C2 (MSW) |
| 15   | Not used             | 15   | Not used              |
| 16   | Datalink In D1 (MSW) | 16   | Datalink Out D1 (MSW) |
| 17   | Not used             | 17   | Not used              |
| 18   | Datalink In D2 (MSW) | 18   | Datalink Out D2 (MSW) |

**Table 5.E PLC-5, SLC 500 or MicroLogix 1100/1400 I/O Image for PowerFlex 700 VC Drives (16-bit Reference/Feedback and 32-bit Datalinks)**

| Word | Output I/O           | Word | Input I/O             |
|------|----------------------|------|-----------------------|
| 0    | Logic Command        | 0    | Logic Status          |
| 1    | Not used             | 1    | Not used              |
| 2    | Reference (MSW)      | 2    | Feedback (MSW)        |
| 3    | Datalink In A1 (LSW) | 3    | Datalink Out A1 (LSW) |
| 4    | Datalink In A1 (MSW) | 4    | Datalink Out A1 (MSW) |
| 5    | Datalink In A2 (LSW) | 5    | Datalink Out A2 (LSW) |
| 6    | Datalink In A2 (MSW) | 6    | Datalink Out A2 (MSW) |
| 7    | Datalink In B1 (LSW) | 7    | Datalink Out B1 (LSW) |
| 8    | Datalink In B1 (MSW) | 8    | Datalink Out B1 (MSW) |
| 9    | Datalink In B2 (LSW) | 9    | Datalink Out B2 (LSW) |
| 10   | Datalink In B2 (MSW) | 10   | Datalink Out B2 (MSW) |
| 11   | Datalink In C1 (LSW) | 11   | Datalink Out C1 (LSW) |
| 12   | Datalink In C1 (MSW) | 12   | Datalink Out C1 (MSW) |
| 13   | Datalink In C2 (LSW) | 13   | Datalink Out C2 (LSW) |
| 14   | Datalink In C2 (MSW) | 14   | Datalink Out C2 (MSW) |
| 15   | Datalink In D1 (LSW) | 15   | Datalink Out D1 (LSW) |
| 16   | Datalink In D1 (MSW) | 16   | Datalink Out D1 (MSW) |
| 17   | Datalink In D2 (LSW) | 17   | Datalink Out D2 (LSW) |
| 18   | Datalink In D2 (MSW) | 18   | Datalink Out D2 (MSW) |

**Table 5.F PLC-5, SLC 500 or MicroLogix 1100/1400 I/O Image for PowerFlex 700S/750-Series Drives (32-bit Reference/Feedback and 32-bit Datalinks)**

| Word | Output I/O           | Word | Input I/O             |
|------|----------------------|------|-----------------------|
| 0    | Logic Command        | 0    | Logic Status          |
| 1    | Reference (LSW)      | 1    | Feedback (LSW)        |
| 2    | Reference (MSW)      | 2    | Feedback (MSW)        |
| 3    | Datalink In A1 (LSW) | 3    | Datalink Out A1 (LSW) |
| 4    | Datalink In A1 (MSW) | 4    | Datalink Out A1 (MSW) |
| 5    | Datalink In A2 (LSW) | 5    | Datalink Out A2 (LSW) |
| 6    | Datalink In A2 (MSW) | 6    | Datalink Out A2 (MSW) |
| 7    | Datalink In B1 (LSW) | 7    | Datalink Out B1 (LSW) |
| 8    | Datalink In B1 (MSW) | 8    | Datalink Out B1 (MSW) |
| 9    | Datalink In B2 (LSW) | 9    | Datalink Out B2 (LSW) |
| 10   | Datalink In B2 (MSW) | 10   | Datalink Out B2 (MSW) |
| 11   | Datalink In C1 (LSW) | 11   | Datalink Out C1 (LSW) |
| 12   | Datalink In C1 (MSW) | 12   | Datalink Out C1 (MSW) |
| 13   | Datalink In C2 (LSW) | 13   | Datalink Out C2 (LSW) |
| 14   | Datalink In C2 (MSW) | 14   | Datalink Out C2 (MSW) |
| 15   | Datalink In D1 (LSW) | 15   | Datalink Out D1 (LSW) |
| 16   | Datalink In D1 (MSW) | 16   | Datalink Out D1 (MSW) |
| 17   | Datalink In D2 (LSW) | 17   | Datalink Out D2 (LSW) |
| 18   | Datalink In D2 (MSW) | 18   | Datalink Out D2 (MSW) |

## Using Logic Command/ Status

The *Logic Command* is a 16-bit word of control data produced by the scanner and consumed by the adapter. The *Logic Status* is a 16-bit word of status data produced by the adapter and consumed by the scanner. PowerFlex 750-Series drives have a 32-bit Logic Command/Status, but when using a 20-COMM-E adapter only the first 16 bits can be used.

This manual contains the bit definitions for most compatible products available at the time of publication in [Appendix D, Logic Command/Status Words](#). For other products, refer to their documentation.

## Using Reference/Feedback

The *Reference* is produced by the controller and consumed by the adapter. The *Feedback* is produced by the adapter and consumed by the controller. The size of the Reference/Feedback is determined by the drive and displayed using adapter **Parameter 18 - [Ref/Fdbk Size]**.

| Size   | Valid Values              |
|--------|---------------------------|
| 16-bit | -32768 to 32767           |
| 32-bit | -2147483648 to 2147483647 |

When the Reference and Feedback are enabled and a ControlLogix controller with a drive Add-On Profile or Classic Profile is used, specific controller tags are automatically created, sized (16-bit or 32-bit), and placed in the I/O image.

## PowerFlex 7-Class Drives (except PowerFlex 750-Series)

The Reference value is a scaled engineering value; it is NOT in Hertz or RPM. The Reference uses a “32767” scale. The “32767” endpoint of the scale is equal to the value of parameter 55 - [Maximum Freq], which has a default value of 130 Hz. For all PowerFlex 70/700 drives, default scaling is 0...15123 which is equal to 0...60.0 Hz. This is based on the formula shown below. Reference scaling is limited by drive parameter 82 - [Maximum Speed]. If the default value of 60 Hz. for parameter 82 - [Maximum Speed] is changed, the speed Reference scaling also changes. To determine Reference scaling, use:

$$(\text{Parameter 82} \div \text{Parameter 55}) * 32767 = \text{Scaling}$$

Using parameter 82 and 55 default values, speed Reference scaling is:

$$(60 \text{ Hz} \div 130 \text{ Hz}) * 32767 = 15123$$

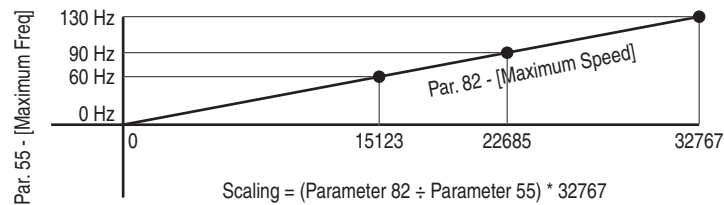
Therefore, 0...15123 = 0...60.0 Hz.

If parameter 82 - [Maximum Speed] is changed to 90 Hz, then:

$$(90 \text{ Hz} \div 130 \text{ Hz}) * 32767 = 22685$$

Therefore, 0...22685 = 0...90.0 Hz.

A graphic representation of this Reference scaling is shown below:



For PowerFlex 70 EC drives (firmware version 2.xxx or later) or PowerFlex 700 VC drives (firmware version 3.xxx or later), parameter 298 - [DPI Ref Select] was added to simplify scaling for the speed Reference. When parameter 298 - [DPI Ref Select] is set to its default “0” (Max Freq), the speed Reference scaling is as shown above. However, when parameter 298 - [DPI Ref Select] is set to “1” (Max Speed), the speed Reference scaling is equal to parameter 82 - [Max Speed]:

$$\text{Parameter 82} = \text{Scaling}$$

Using the parameter 82 default value, speed Reference scaling is:

$$0...32767 = 0...60.0 \text{ Hz.}$$

If parameter 82 - [Maximum Speed] is changed to 90 Hz, then:

$$90 \text{ Hz} = 32767$$

Speed Feedback uses the same scaling as the speed Reference.



**TIP:** For PowerFlex 700 VC drives (firmware version 3.xxx or later), Parameter 299 - [DPI Fdbk Select] enables you to select the feedback data coming from the drive over DPI. The default is “Speed Fdbk” in Hz or RPM determined by Parameter 079 - [Speed Units]. The data selection for Parameter 299 is also displayed on the 1st line of the HIM and on DriveExplorer and DriveExecutive screens in the drive status area of the screen.

### PowerFlex 750-Series Drives

The Reference value is Hz x 1000 or RPM x 1000. Drive Parameter 300 - [Speed Units] determines whether the scaling is Hz or RPM. The default scaling is Hz, where 0...60,000 equates to 0...60.000 Hz. When Parameter 300 is set to RPM, then 0...1,765,000 equates to 0...1765.000 RPM.

## Using Datalinks

A Datalink is a mechanism used by PowerFlex drives to transfer data to and from the controller. Datalinks allow a drive parameter value to be read or written without using an Explicit Message. When enabled, each Datalink occupies two 16-bit or 32-bit words in both the input and output image. Use adapter **Parameter 19 - [Datalink Size]** to determine whether the drive uses 16-bit or 32-bit words for Datalinks.

### Rules for Using Datalinks

- Each set of Datalink parameters in a PowerFlex drive can be used by only one adapter. If more than one adapter is connected to a single drive, multiple adapters cannot use the same Datalink.
- Parameter settings in the drive determine the data passed through the Datalink mechanism. Refer to the documentation for your drive.
- When you use a Datalink to change a value, the value is NOT written to the Non-Volatile Storage (NVS). The value is stored in volatile memory and lost when the drive loses power. Thus, use Datalinks when you need to change a value of a parameter frequently.

### Datalink Scaling

#### PowerFlex 7-Class Drives (except PowerFlex 750-Series)

When using RSLogix 5000 version 16 (or later), Datalink scaling is done automatically. However, when using RSLogix 5000 version 15 (or earlier)—or when using a PLC-5, SLC 500 or MicroLogix 1100/1400 controller—Datalink scaling is not automatic and uses whole numbers (INTs or DINTs). Refer to the drive documentation to determine the unit resolution for the associated parameter Datalink. For example, PowerFlex 700VC drive Parameter 3 - [Output Current] has a 0.1 unit resolution.

Because Datalink scaling uses whole numbers, the Output Current value is multiplied by 10 in the adapter and then sent over the network. Suppose the actual Output Current value is 35.5 amps. Reading the associated parameter Datalink received by the controller, the value would be 355. By using ladder logic, divide the value by 10 in the controller to get the correct scaling.

### PowerFlex 750-Series Drives

When using RSLogix 5000 version 16 (or later), Datalink scaling is done automatically. However, when using RSLogix 5000 version 15 (or earlier)—or when using a PLC-5, SLC 500 or MicroLogix 1100/1400 controller—Datalinks require scaling in the following way. Parameters are either 32-bit integers or REALs. When the parameter is a 32-bit integer, the data needs to be copied using a COP command to a DINT tag. (Since PLC-5, SLC 500, and MicroLogix 1100/1400 controllers do not support 32-bit integers, the data must be separated into two 16-bit integers.) When the parameter is a REAL, the data needs to be copied using a COP command to a REAL tag. Refer to subsequent sections in this chapter for ladder logic examples.

### Using 16-Bit Datalinks to Read/Write 32-Bit Parameters

This subsection only pertains to PowerFlex 70 (SC or EC), PowerFlex 700 (SC), and PowerFlex 700H drives which use 16-bit Datalinks. To read or write a 32-bit parameter using 16-bit Datalinks, typically both Datalinks of a pair (A, B, C, D) are set to the same 32-bit parameter. For example, to read Parameter 10 - [Elapsed Run Time] in a PowerFlex 70 drive, both Datalink A1 Out (Parameter 310) and Datalink A2 Out (Parameter 311) are set to “10.” Datalink A1 Out will contain the least significant word (LSW) and Datalink A2 Out will contain the most significant word (MSW).

32-bit data is stored in binary as follows:

|     |                           |
|-----|---------------------------|
| MSW | $2^{31}$ through $2^{16}$ |
| LSW | $2^{15}$ through $2^0$    |

In this example, the Parameter 10 - [Elapsed Run Time] value of 6553.9 Hrs is read as “6553.9” in Datalink A1 Out (Parameter 310) and Datalink A2 Out (Parameter 311).

| Datalink | Word | Parameter | Data (Hex) |
|----------|------|-----------|------------|
| A1 Out   | LSW  | 10        | 0003       |
| A2 Out   | MSW  | 10        | 0001       |

#### Conversion Example:

Parameter 010 - [Elapsed Run Time] = 6553.9 Hrs  
 MSW =  $0001_{\text{hex}} = 0001_{\text{binary}} = 2^{16} = 65536$   
 LSW =  $0003_{\text{hex}} = 3$   
 Engineering Value =  $65536 + 3 = 65539$   
 Parameter 10 Displayed Value = 6553.9 Hrs

Regardless of the Datalink combination, Datalink x1 Out will always contain the LSW and Datalink x2 Out will always contain the MSW. In the following example, the PowerFlex 70 drive Parameter 242 - [Power Up Marker] contains a value of 88.4541 hours.

| Datalink | Word | Parameter | Data (Hex) |
|----------|------|-----------|------------|
| A2 Out   | MSW  | 242       | 000D       |
| B1 Out   | LSW  | 242       | 7F3D       |

#### Conversion Example:

Parameter 242 - [Power Up Marker] = 88.4541 hours  
 MSW =  $000D_{\text{hex}} = 1101_{\text{binary}} = 2^{19} + 2^{18} + 2^{16} = 851968$   
 LSW =  $7F3D_{\text{hex}} = 32573$   
 Engineering Value =  $851968 + 32573 = 884541$   
 Parameter 242 Displayed Value = 88.4541 Hrs

## Example Ladder Logic Program Information

The example ladder logic programs in the sections of this chapter are intended for and operate PowerFlex 7-Class drives.

### Functions of the Example Programs

The example programs enable you to:

- Receive Logic Status information from the drive.
- Send a Logic Command to control the drive (for example, start, stop).
- Send a Reference to the drive and receive Feedback from the drive.
- Send/receive Datalink data to/from the drive.

### Logic Command/Status Words

These examples use the Logic Command word and Logic Status word for PowerFlex 70/700 drives. Information for PowerFlex 750-Series drives has been added to the examples where applicable. Refer to [Appendix D](#) to view details. The definition of the bits in these words may vary if you are using a different DPI drive. Refer to the documentation for your drive.

## ControlLogix Example

### Creating Ladder Logic Using the RSLogix 5000 Drive Add-On Profiles (version 16 or later)

Since the drive Add-On Profile automatically created descriptive controller tags (Figure 4.12) for the entire I/O image in Chapter 4, you can use these tags to directly control and monitor the drive without creating any ladder logic program. However, if you intend to use Human Machine Interface devices (PanelView, etc.) to operate the drive and view its status, you will need to create descriptive user-defined Program tags (Figure 5.1) and a ladder logic program that will pass the Controller tag data to the Program tags.

**Figure 5.1 ControlLogix Program Tags for Drive Add-On Profile Ladder Logic Program Example**

| Name                    | Style   | Data Type |
|-------------------------|---------|-----------|
| Command_Clear_Faults    | Decimal | BOOL      |
| Command_Forward_Reverse | Decimal | BOOL      |
| Command_Log             | Decimal | BOOL      |
| Command_Start           | Decimal | BOOL      |
| Command_Stop            | Decimal | BOOL      |
| Speed_Feedback          | Decimal | DINT      |
| Speed_Reference         | Decimal | DINT      |
| Status_Active           | Decimal | BOOL      |
| Status_At_Speed         | Decimal | BOOL      |
| Status_Faulted          | Decimal | BOOL      |
| Status_Forward          | Decimal | BOOL      |
| Status_Ready            | Decimal | BOOL      |
| Status_Reverse          | Decimal | BOOL      |

An example ladder logic program that uses the automatically created descriptive Controller tags and passes their data to the user-defined Program tags is shown in Figure 5.2 and Figure 5.3. Note that the prefix for the drive Controller tags is determined by the name assigned when configuring the I/O (Chapter 4). For information on speed Reference and Feedback scaling, see [PowerFlex 7-Class Drives \(except PowerFlex 750-Series\) on page 5-6](#) or [PowerFlex 750-Series Drives on page 5-7](#).

**Figure 5.2 ControlLogix Example Ladder Logic Program Using a Drive Add-On Profile for Logic Status/Feedback**

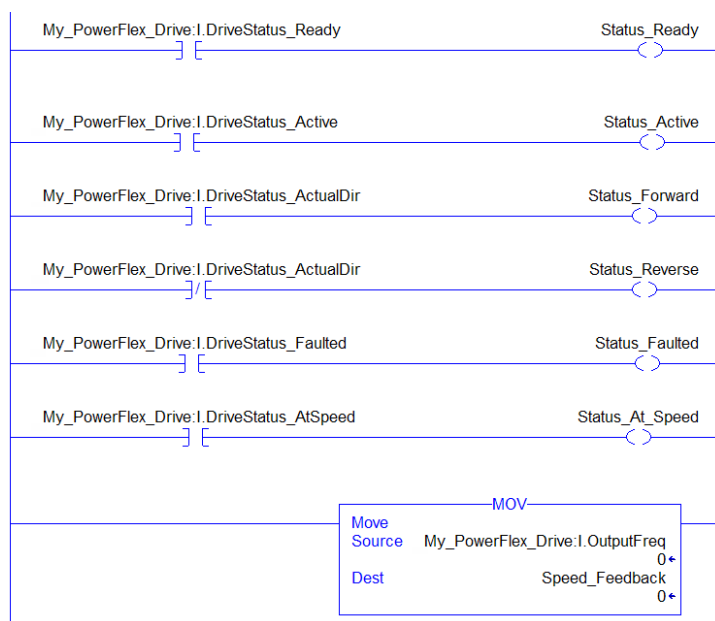
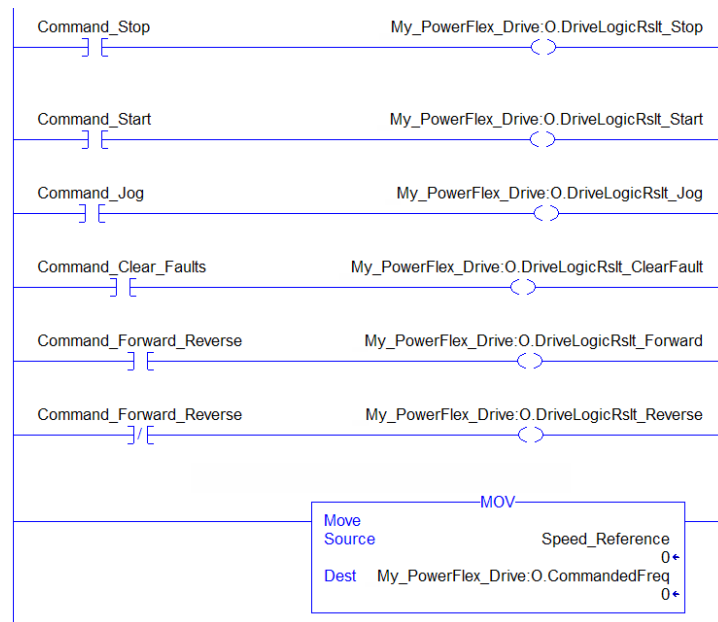


**Figure 5.3 ControlLogix Example Ladder Logic Program Using a Drive Add-On Profile for Logic Command/Reference**



### Creating Ladder Logic Using the RSLogix 5000 Classic Profile (versions 13...15)

Since the RSLogix 5000 Classic Profile has been significantly improved upon by RSLogix 5000 drive Add-On Profiles (version 16 or later), it is highly recommended to use RSLogix 5000 drive Add-On Profiles to take advantage of its benefits (more intuitive, time saving, and less likely to make ladder logic program errors).

## Creating Ladder Logic Using the RSLogix 5000 Generic Profile (all versions)

### Drive and Adapter Parameter Settings

The following drive and adapter settings were used for the example ladder logic program in this section.

| Device                                    | Parameter                                         | Value                    | Description                                                                                |
|-------------------------------------------|---------------------------------------------------|--------------------------|--------------------------------------------------------------------------------------------|
| PowerFlex 70 EC Drive                     | 90 - [Speed Ref A Sel]                            | 22 (DPI Port 5)          | Assigns 20-COMM-E to be used for the Reference.                                            |
|                                           | 300 - [Data In A1]                                | 140                      | Points to Par. 140 - [Accel Time 1]                                                        |
|                                           | 301 - [Data In A2]                                | 142                      | Points to Par. 142 - [Decel Time 1]                                                        |
|                                           | 302 - [Data In B1]                                | 100                      | Points to Par. 100 - [Jog Speed]                                                           |
|                                           | 303 - [Data In B2]                                | 155                      | Points to Par. 155 - [Stop Mode A]                                                         |
|                                           | 304 - [Data In C1]                                | 101                      | Points to Par. 101 - [Preset Speed 1]                                                      |
|                                           | 305 - [Data In C2]                                | 102                      | Points to Par. 102 - [Preset Speed 2]                                                      |
|                                           | 306 - [Data In D1]                                | 103                      | Points to Par. 103 - [Preset Speed 3]                                                      |
|                                           | 307 - [Data In D2]                                | 104                      | Points to Par. 104 - [Preset Speed 4]                                                      |
|                                           | 310 - [Data Out A1]                               | 140                      | Points to Par. 140 - [Accel Time 1]                                                        |
|                                           | 311 - [Data Out A2]                               | 142                      | Points to Par. 142 - [Decel Time 1]                                                        |
|                                           | 312 - [Data Out B1]                               | 100                      | Points to Par. 100 - [Jog Speed]                                                           |
|                                           | 313 - [Data Out B2]                               | 155                      | Points to Par. 155 - [Stop Mode A]                                                         |
|                                           | 314 - [Data Out C1]                               | 101                      | Points to Par. 101 - [Preset Speed 1]                                                      |
|                                           | 315 - [Data Out C2]                               | 102                      | Points to Par. 102 - [Preset Speed 2]                                                      |
|                                           | 316 - [Data Out D1]                               | 103                      | Points to Par. 103 - [Preset Speed 3]                                                      |
|                                           | 317 - [Data Out D2]                               | 104                      | Points to Par. 104 - [Preset Speed 4]                                                      |
| PowerFlex 750-Series Drive <sup>(1)</sup> | 545 - [Spd Ref A Sel]                             | Port 0: Port 6 Reference | Assigns 20-COMM-E to be used for the Reference.                                            |
|                                           | 895 - [Data In A1]                                | Port 0: Accel Time 1     | Points to Par. 535 in the drive.                                                           |
|                                           | 896 - [Data In A2]                                | Port 0: Testpoint Sel 1  | Points to Par. 970 in the drive.                                                           |
|                                           | 897 - [Data In B1]                                | Port 5: Anlg Out1 Hi     | Points to Par. 90 in Port 5 (I/O module).                                                  |
|                                           | 905 - [Data Out A1]                               | Port 0: DC Bus Volts     | Points to Par. 11 in the drive.                                                            |
|                                           | 906 - [Data Out A2]                               | Port 0: Open Loop Fdbk   | Points to Par. 137 in the drive.                                                           |
|                                           | 907 - [Data Out B1]                               | Port 5: Anlg Out0 Data   | Points to Par. 77 in Port 5 (I/O module).                                                  |
| 20-COMM-E Adapter                         | 04 - [IP Addr Cfg 1]<br>⋮<br>07 - [IP Addr Cfg 4] | 10.91.100.79             | IP address for the adapter.                                                                |
|                                           | 08 - [Subnet Cfg 1]<br>⋮<br>11 - [Subnet Cfg 4]   | 255.255.248.0            | Subnet mask for the adapter.                                                               |
|                                           | 23 - [DPI I/O Cfg]                                | xxx1 1111                | Enables Cmd/Ref and Datalinks A...D.                                                       |
|                                           | 35 - [M-S Input]                                  | xxx1 1111                | Configures the I/O Data to be transferred from the controller on the network to the drive. |
|                                           | 36 - [M-S Output]                                 | xxx1 1111                | Configures the I/O Data to be transferred from the drive to the controller on the network. |
|                                           |                                                   |                          |                                                                                            |

<sup>(1)</sup> In this example, the 20-COMM-E adapter/20-750-20COMM Option Card is installed in Port 6, and a 24V I/O module is installed in Port 5. Also, Data In B2...D2 (Parameters 898...902) and Data Out B2...D2 (Parameters 908...912) are enabled, but not used.



**TIP:** Data In parameters are inputs into the drive that come from controller outputs (for example, data to write to a drive parameter). Data Out parameters are outputs from the drive that go to controller inputs (for example, data to read a drive parameter).

## Controller Tags

When you add the adapter and drive to the I/O configuration ([Chapter 4](#)), RSLogix 5000 automatically creates generic (non-descriptive) controller tags for them. In this example program, the following controller tags are used.

**Figure 5.4 ControlLogix Controller Tags for Drive Generic Profile Example Ladder Logic Program**

| Name                 | Data Type   | Description |
|----------------------|-------------|-------------|
| My_PowerFlex_Drive:C | AB:ETHER... |             |
| My_PowerFlex_Drive:I | AB:ETHER... |             |
| My_PowerFlex_Drive:O | AB:ETHER... |             |

You can expand the Input and Output tags to reveal the input and output configuration.

**Figure 5.5 ControlLogix Input Image for Drive Generic Profile Example Ladder Logic Program**

| Name                          | Data Type   | Description     |
|-------------------------------|-------------|-----------------|
| My_PowerFlex_Drive:I          | AB:ETHER... |                 |
| My_PowerFlex_Drive:I.Data     | INT[12]     | Input Image     |
| My_PowerFlex_Drive:I.Data[0]  | INT         | Pad Word        |
| My_PowerFlex_Drive:I.Data[1]  | INT         | Pad Word        |
| My_PowerFlex_Drive:I.Data[2]  | INT         | Logic Status    |
| My_PowerFlex_Drive:I.Data[3]  | INT         | Speed Feedback  |
| My_PowerFlex_Drive:I.Data[4]  | INT         | Datalink Out A1 |
| My_PowerFlex_Drive:I.Data[5]  | INT         | Datalink Out A2 |
| My_PowerFlex_Drive:I.Data[6]  | INT         | Datalink Out B1 |
| My_PowerFlex_Drive:I.Data[7]  | INT         | Datalink Out B2 |
| My_PowerFlex_Drive:I.Data[8]  | INT         | Datalink Out C1 |
| My_PowerFlex_Drive:I.Data[9]  | INT         | Datalink Out C2 |
| My_PowerFlex_Drive:I.Data[10] | INT         | Datalink Out D1 |
| My_PowerFlex_Drive:I.Data[11] | INT         | Datalink Out D2 |

PowerFlex 70 Drive  
16-bit Speed Feedback and  
Datalinks

| Name                          | Data Type   | Description           |
|-------------------------------|-------------|-----------------------|
| My_PowerFlex_Drive:I          | AB:ETHER... |                       |
| My_PowerFlex_Drive:I.Data     | INT[22]     | Input Image           |
| My_PowerFlex_Drive:I.Data[0]  | INT         | Pad Word              |
| My_PowerFlex_Drive:I.Data[1]  | INT         | Pad Word              |
| My_PowerFlex_Drive:I.Data[2]  | INT         | Logic Status          |
| My_PowerFlex_Drive:I.Data[3]  | INT         | Not Used              |
| My_PowerFlex_Drive:I.Data[4]  | INT         | FeedBack (LSW)        |
| My_PowerFlex_Drive:I.Data[5]  | INT         | FeedBack (MSW)        |
| My_PowerFlex_Drive:I.Data[6]  | INT         | Datalink Out A1 (LSW) |
| My_PowerFlex_Drive:I.Data[7]  | INT         | Datalink Out A1 (MSW) |
| My_PowerFlex_Drive:I.Data[8]  | INT         | Datalink Out A2 (LSW) |
| My_PowerFlex_Drive:I.Data[9]  | INT         | Datalink Out A2 (MSW) |
| My_PowerFlex_Drive:I.Data[10] | INT         | Datalink Out B1 (LSW) |
| My_PowerFlex_Drive:I.Data[11] | INT         | Datalink Out B1 (MSW) |
| My_PowerFlex_Drive:I.Data[12] | INT         | Datalink Out B2 (LSW) |
| My_PowerFlex_Drive:I.Data[13] | INT         | Datalink Out B2 (MSW) |
| My_PowerFlex_Drive:I.Data[14] | INT         | Datalink Out C1 (LSW) |
| My_PowerFlex_Drive:I.Data[15] | INT         | Datalink Out C1 (MSW) |
| My_PowerFlex_Drive:I.Data[16] | INT         | Datalink Out C2 (LSW) |
| My_PowerFlex_Drive:I.Data[17] | INT         | Datalink Out C2 (MSW) |
| My_PowerFlex_Drive:I.Data[18] | INT         | Datalink Out D1 (LSW) |
| My_PowerFlex_Drive:I.Data[19] | INT         | Datalink Out D1 (MSW) |
| My_PowerFlex_Drive:I.Data[20] | INT         | Datalink Out D2 (LSW) |
| My_PowerFlex_Drive:I.Data[21] | INT         | Datalink Out D2 (MSW) |

PowerFlex 750-Series Drive  
32-bit Speed Feedback and  
Datalinks

**Figure 5.6 ControlLogix Output Image for Drive Generic Profile Example Ladder Logic Program**

| Name                         | △ | Data Type   | Description     |
|------------------------------|---|-------------|-----------------|
| My_PowerFlex_Drive:0         |   | AB:ETHER... |                 |
| My_PowerFlex_Drive:0.Data    |   | INT[10]     | Output Image    |
| My_PowerFlex_Drive:0.Data[0] |   | INT         | Logic Command   |
| My_PowerFlex_Drive:0.Data[1] |   | INT         | Speed Reference |
| My_PowerFlex_Drive:0.Data[2] |   | INT         | Datalink In A1  |
| My_PowerFlex_Drive:0.Data[3] |   | INT         | Datalink In A2  |
| My_PowerFlex_Drive:0.Data[4] |   | INT         | Datalink In B1  |
| My_PowerFlex_Drive:0.Data[5] |   | INT         | Datalink In B2  |
| My_PowerFlex_Drive:0.Data[6] |   | INT         | Datalink In C1  |
| My_PowerFlex_Drive:0.Data[7] |   | INT         | Datalink In C2  |
| My_PowerFlex_Drive:0.Data[8] |   | INT         | Datalink In D1  |
| My_PowerFlex_Drive:0.Data[9] |   | INT         | Datalink In D2  |

PowerFlex 70 Drive  
16-bit Speed Reference and  
Datalinks

| Name                          | △ | Data Type   | Description          |
|-------------------------------|---|-------------|----------------------|
| My_PowerFlex_Drive:0          |   | AB:ETHER... |                      |
| My_PowerFlex_Drive:0.Data     |   | INT[20]     | Output Image         |
| My_PowerFlex_Drive:0.Data[0]  |   | INT         | Logic Command        |
| My_PowerFlex_Drive:0.Data[1]  |   | INT         | Not Used             |
| My_PowerFlex_Drive:0.Data[2]  |   | INT         | Reference (LSW)      |
| My_PowerFlex_Drive:0.Data[3]  |   | INT         | Reference (MSW)      |
| My_PowerFlex_Drive:0.Data[4]  |   | INT         | Datalink In A1 (LSW) |
| My_PowerFlex_Drive:0.Data[5]  |   | INT         | Datalink In A1 (MSW) |
| My_PowerFlex_Drive:0.Data[6]  |   | INT         | Datalink In A2 (LSW) |
| My_PowerFlex_Drive:0.Data[7]  |   | INT         | Datalink In A2 (MSW) |
| My_PowerFlex_Drive:0.Data[8]  |   | INT         | Datalink In B1 (LSW) |
| My_PowerFlex_Drive:0.Data[9]  |   | INT         | Datalink In B1 (MSW) |
| My_PowerFlex_Drive:0.Data[10] |   | INT         | Datalink In B2 (LSW) |
| My_PowerFlex_Drive:0.Data[11] |   | INT         | Datalink In B2 (MSW) |
| My_PowerFlex_Drive:0.Data[12] |   | INT         | Datalink In C1 (LSW) |
| My_PowerFlex_Drive:0.Data[13] |   | INT         | Datalink In C1 (MSW) |
| My_PowerFlex_Drive:0.Data[14] |   | INT         | Datalink In C2 (LSW) |
| My_PowerFlex_Drive:0.Data[15] |   | INT         | Datalink In C2 (MSW) |
| My_PowerFlex_Drive:0.Data[16] |   | INT         | Datalink In D1 (LSW) |
| My_PowerFlex_Drive:0.Data[17] |   | INT         | Datalink In D1 (MSW) |
| My_PowerFlex_Drive:0.Data[18] |   | INT         | Datalink In D2 (LSW) |
| My_PowerFlex_Drive:0.Data[19] |   | INT         | Datalink In D2 (MSW) |

PowerFlex 750-Series Drive  
32-bit Speed Reference and  
Datalinks

### Program Tags

To use the Controller tags that are automatically created, you need to create the following Program tags for this example program.

**Figure 5.7 ControlLogix Program Tags for Drive Generic Profile Example Ladder Logic Program**

| Name                    | △ | Style   | Data Type |
|-------------------------|---|---------|-----------|
| Command_Clear_Faults    |   | Decimal | BOOL      |
| Command_Forward_Reverse |   | Decimal | BOOL      |
| Command_Jog             |   | Decimal | BOOL      |
| Command_Start           |   | Decimal | BOOL      |
| Command_Stop            |   | Decimal | BOOL      |
| Speed_Feedback          |   | Decimal | DINT      |
| Speed_Reference         |   | Decimal | DINT      |
| Status_Active           |   | Decimal | BOOL      |
| Status_At_Speed         |   | Decimal | BOOL      |
| Status_Faulted          |   | Decimal | BOOL      |
| Status_Forward          |   | Decimal | BOOL      |
| Status_Ready            |   | Decimal | BOOL      |
| Status_Reverse          |   | Decimal | BOOL      |

For information on speed Reference and Feedback scaling, see [PowerFlex 7-Class Drives \(except PowerFlex 750-Series\) on page 5-6](#) or [PowerFlex 750-Series Drives on page 5-7](#).

**Figure 5.8 ControlLogix Example Ladder Logic Program Using a Drive Generic Profile for Logic Status/Feedback**

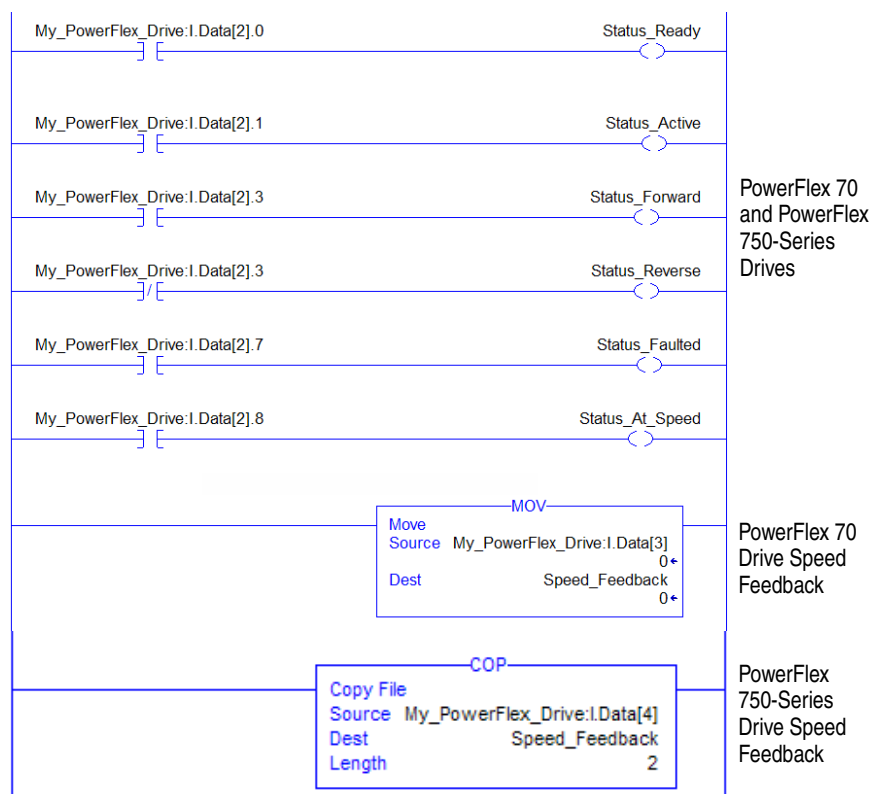
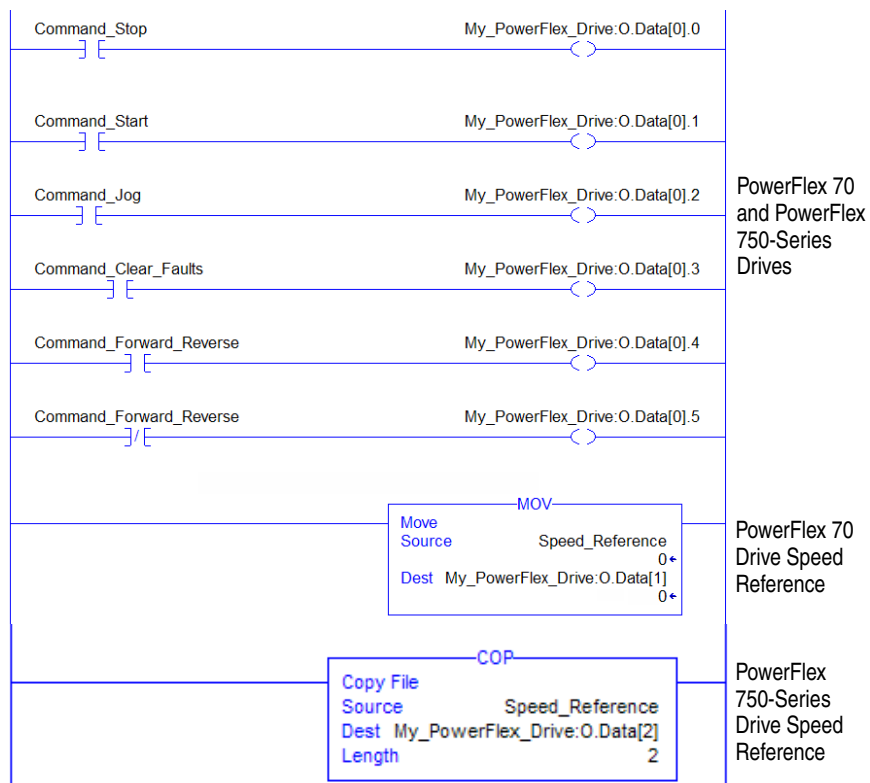


**Figure 5.9 ControlLogix Example Ladder Logic Program Using a Drive Generic Profile for Logic Command/Reference**



## Example Datalink Data

The Datalink data used in the example program is shown in [Figure 5.10](#). Note that to describe the parameters to which the Datalinks are assigned, you may want to add descriptions to the automatically-created generic controller tags or create a User Defined Data Types (UDDT).

**Figure 5.10 ControlLogix Example Datalinks for Ladder Logic Program Using a Drive Generic Profile**

| Name                         | Value | Data Type   | Description     |
|------------------------------|-------|-------------|-----------------|
| My_PowerFlex_DriveI          | {...} | AB:ETHER... |                 |
| My_PowerFlex_DriveI.Data     | {...} | INT[12]     | Input Image     |
| My_PowerFlex_DriveI.Data[0]  | 0     | INT         | Pad Word        |
| My_PowerFlex_DriveI.Data[1]  | 0     | INT         | Pad Word        |
| My_PowerFlex_DriveI.Data[2]  | 0     | INT         | Logic Status    |
| My_PowerFlex_DriveI.Data[3]  | 0     | INT         | Speed Feedback  |
| My_PowerFlex_DriveI.Data[4]  | 50    | INT         | Datalink Out A1 |
| My_PowerFlex_DriveI.Data[5]  | 50    | INT         | Datalink Out A2 |
| My_PowerFlex_DriveI.Data[6]  | 100   | INT         | Datalink Out B1 |
| My_PowerFlex_DriveI.Data[7]  | 1     | INT         | Datalink Out B2 |
| My_PowerFlex_DriveI.Data[8]  | 200   | INT         | Datalink Out C1 |
| My_PowerFlex_DriveI.Data[9]  | 300   | INT         | Datalink Out C2 |
| My_PowerFlex_DriveI.Data[10] | 400   | INT         | Datalink Out D1 |
| My_PowerFlex_DriveI.Data[11] | 500   | INT         | Datalink Out D2 |
| My_PowerFlex_DriveO          | {...} | AB:ETHER... |                 |
| My_PowerFlex_DriveO.Data     | {...} | INT[10]     | Output Image    |
| My_PowerFlex_DriveO.Data[0]  | 0     | INT         | Logic Command   |
| My_PowerFlex_DriveO.Data[1]  | 0     | INT         | Speed Reference |
| My_PowerFlex_DriveO.Data[2]  | 50    | INT         | Datalink In A1  |
| My_PowerFlex_DriveO.Data[3]  | 50    | INT         | Datalink In A2  |
| My_PowerFlex_DriveO.Data[4]  | 100   | INT         | Datalink In B1  |
| My_PowerFlex_DriveO.Data[5]  | 1     | INT         | Datalink In B2  |
| My_PowerFlex_DriveO.Data[6]  | 200   | INT         | Datalink In C1  |
| My_PowerFlex_DriveO.Data[7]  | 300   | INT         | Datalink In C2  |
| My_PowerFlex_DriveO.Data[8]  | 400   | INT         | Datalink In D1  |
| My_PowerFlex_DriveO.Data[9]  | 500   | INT         | Datalink In D2  |

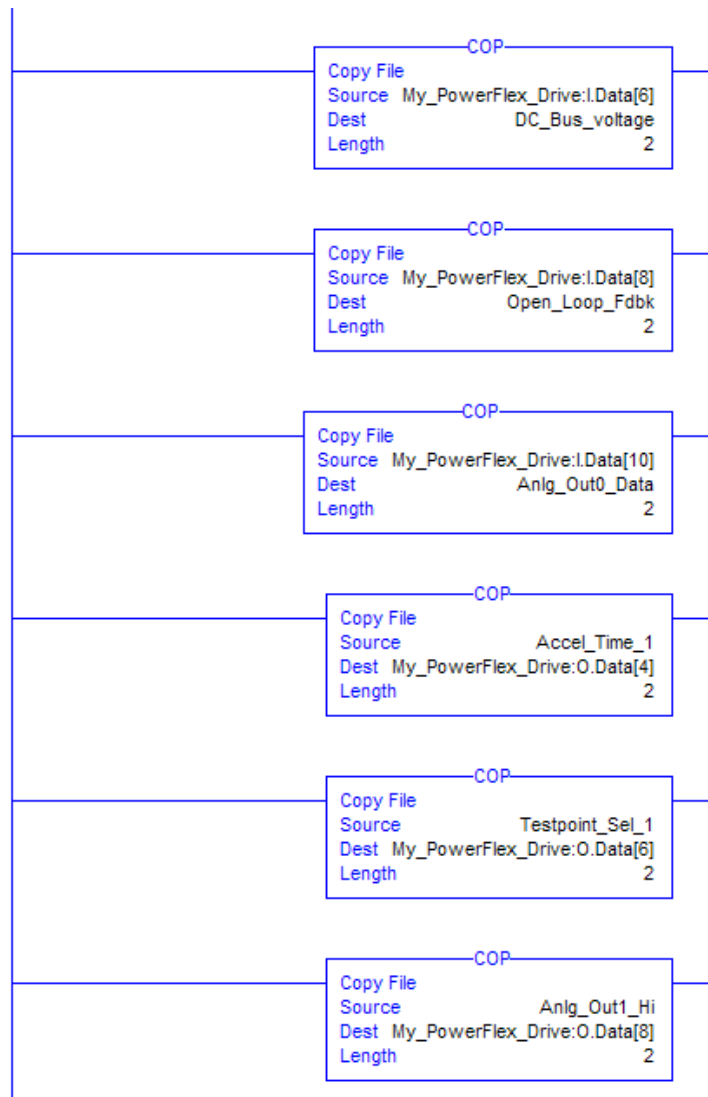
PowerFlex 70 Drive

| Name                         | Value  | Data Type   | Description           |
|------------------------------|--------|-------------|-----------------------|
| My_PowerFlex_DriveI          | {...}  | AB:ETHER... |                       |
| My_PowerFlex_DriveI.Data     | {...}  | INT[22]     | Input Image           |
| My_PowerFlex_DriveI.Data[0]  | 0      | INT         | Pad Word              |
| My_PowerFlex_DriveI.Data[1]  | 0      | INT         | Pad Word              |
| My_PowerFlex_DriveI.Data[2]  | 1295   | INT         | Logic Status          |
| My_PowerFlex_DriveI.Data[3]  | 0      | INT         | Not Used              |
| My_PowerFlex_DriveI.Data[4]  | 25000  | INT         | Feedback (LSW)        |
| My_PowerFlex_DriveI.Data[5]  | 0      | INT         | Feedback (MSW)        |
| My_PowerFlex_DriveI.Data[6]  | -26970 | INT         | Datalink Out A1 (LSW) |
| My_PowerFlex_DriveI.Data[7]  | 17432  | INT         | Datalink Out A1 (MSW) |
| My_PowerFlex_DriveI.Data[8]  | 15562  | INT         | Datalink Out A2 (LSW) |
| My_PowerFlex_DriveI.Data[9]  | 5457   | INT         | Datalink Out A2 (MSW) |
| My_PowerFlex_DriveI.Data[10] | 0      | INT         | Datalink Out B1 (LSW) |
| My_PowerFlex_DriveI.Data[11] | 16840  | INT         | Datalink Out B1 (MSW) |
| My_PowerFlex_DriveI.Data[12] | 0      | INT         | Datalink Out B2 (LSW) |
| My_PowerFlex_DriveI.Data[13] | 0      | INT         | Datalink Out B2 (MSW) |
| My_PowerFlex_DriveI.Data[14] | 0      | INT         | Datalink Out C1 (LSW) |
| My_PowerFlex_DriveI.Data[15] | 0      | INT         | Datalink Out C1 (MSW) |
| My_PowerFlex_DriveI.Data[16] | 0      | INT         | Datalink Out C2 (LSW) |
| My_PowerFlex_DriveI.Data[17] | 0      | INT         | Datalink Out C2 (MSW) |
| My_PowerFlex_DriveI.Data[18] | 0      | INT         | Datalink Out D1 (LSW) |
| My_PowerFlex_DriveI.Data[19] | 0      | INT         | Datalink Out D1 (MSW) |
| My_PowerFlex_DriveI.Data[20] | 0      | INT         | Datalink Out D2 (LSW) |
| My_PowerFlex_DriveI.Data[21] | 0      | INT         | Datalink Out D2 (MSW) |
| My_PowerFlex_DriveO          | {...}  | AB:ETHER... |                       |
| My_PowerFlex_DriveO.Data     | {...}  | INT[20]     | Output Image          |
| My_PowerFlex_DriveO.Data[0]  | 0      | INT         | Logic Command         |
| My_PowerFlex_DriveO.Data[1]  | 0      | INT         | Not Used              |
| My_PowerFlex_DriveO.Data[2]  | 25000  | INT         | Reference (LSW)       |
| My_PowerFlex_DriveO.Data[3]  | 0      | INT         | Reference (MSW)       |
| My_PowerFlex_DriveO.Data[4]  | 0      | INT         | Datalink In A1 (LSW)  |
| My_PowerFlex_DriveO.Data[5]  | 16680  | INT         | Datalink In A1 (MSW)  |
| My_PowerFlex_DriveO.Data[6]  | 4430   | INT         | Datalink In A2 (LSW)  |
| My_PowerFlex_DriveO.Data[7]  | 1909   | INT         | Datalink In A2 (MSW)  |
| My_PowerFlex_DriveO.Data[8]  | -2621  | INT         | Datalink In B1 (LSW)  |
| My_PowerFlex_DriveO.Data[9]  | 16664  | INT         | Datalink In B1 (MSW)  |
| My_PowerFlex_DriveO.Data[10] | 0      | INT         | Datalink In B2 (LSW)  |
| My_PowerFlex_DriveO.Data[11] | 0      | INT         | Datalink In B2 (MSW)  |

PowerFlex 750-Series Drive

For PowerFlex 7-Class drives, the scaling may need to be multiplied by 10 or 100, depending on the parameter. For more information, see [Datalink Scaling on page 5-7](#).

**Figure 5.11 ControlLogix Example Ladder Logic Program Using a Drive Generic Profile for PowerFlex 750-Series Drives Datalink Scaling**



For PowerFlex 750-Series drives, the destination tag can be a REAL or DINT. Make the destination tag the same data type as the parameter being read. For information on Datalink scaling, see [page 5-8](#).

## PLC-5, SLC 500 or MicroLogix 1100/1400 Example

### Drive and Adapter Parameter Settings

The following drive and adapter settings were used for the example ladder logic program in this section.

| Device                                    | Parameter                                         | Value                    | Description                                                                                |
|-------------------------------------------|---------------------------------------------------|--------------------------|--------------------------------------------------------------------------------------------|
| PowerFlex 70 EC Drive                     | 90 - [Speed Ref A Sel]                            | 22 (DPI Port 5)          | Assigns 20-COMM-E to be used for the Reference.                                            |
|                                           | 300 - [Data In A1]                                | 140                      | Points to Par. 140 - [Accel Time 1]                                                        |
|                                           | 301 - [Data In A2]                                | 142                      | Points to Par. 142 - [Decel Time 1]                                                        |
|                                           | 302 - [Data In B1]                                | 100                      | Points to Par. 100 - [Jog Speed]                                                           |
|                                           | 303 - [Data In B2]                                | 155                      | Points to Par. 155 - [Stop Mode A]                                                         |
|                                           | 304 - [Data In C1]                                | 101                      | Points to Par. 101 - [Preset Speed 1]                                                      |
|                                           | 305 - [Data In C2]                                | 102                      | Points to Par. 102 - [Preset Speed 2]                                                      |
|                                           | 306 - [Data In D1]                                | 103                      | Points to Par. 103 - [Preset Speed 3]                                                      |
|                                           | 307 - [Data In D2]                                | 104                      | Points to Par. 104 - [Preset Speed 4]                                                      |
|                                           | 310 - [Data Out A1]                               | 140                      | Points to Par. 140 - [Accel Time 1]                                                        |
|                                           | 311 - [Data Out A2]                               | 142                      | Points to Par. 142 - [Decel Time 1]                                                        |
|                                           | 312 - [Data Out B1]                               | 100                      | Points to Par. 100 - [Jog Speed]                                                           |
|                                           | 313 - [Data Out B2]                               | 155                      | Points to Par. 155 - [Stop Mode A]                                                         |
|                                           | 314 - [Data Out C1]                               | 101                      | Points to Par. 101 - [Preset Speed 1]                                                      |
|                                           | 315 - [Data Out C2]                               | 102                      | Points to Par. 102 - [Preset Speed 2]                                                      |
|                                           | 316 - [Data Out D1]                               | 103                      | Points to Par. 103 - [Preset Speed 3]                                                      |
|                                           | 317 - [Data Out D2]                               | 104                      | Points to Par. 104 - [Preset Speed 4]                                                      |
| PowerFlex 750-Series Drive <sup>(1)</sup> | 545 - [Spd Ref A Sel]                             | Port 0: Port 6 Reference | Assigns 20-COMM-E to be used for the Reference.                                            |
|                                           | 895 - [Data In A1]                                | Port 0: Accel Time 1     | Points to Par. 535 in the drive.                                                           |
|                                           | 896 - [Data In A2]                                | Port 0: Testpoint Sel 1  | Points to Par. 970 in the drive.                                                           |
|                                           | 897 - [Data In B1]                                | Port 5: Anlg Out1 Hi     | Points to Par. 90 in Port 5 (I/O module).                                                  |
|                                           | 905 - [Data Out A1]                               | Port 0: DC Bus Volts     | Points to Par. 11 in the drive.                                                            |
|                                           | 906 - [Data Out A2]                               | Port 0: Open Loop Fdbk   | Points to Par. 137 in the drive.                                                           |
|                                           | 907 - [Data Out B1]                               | Port 5: Anlg Out0 Data   | Points to Par. 77 in Port 5 (I/O module).                                                  |
| 20-COMM-E Adapter                         | 04 - [IP Addr Cfg 1]<br>⋮<br>07 - [IP Addr Cfg 4] | 10.91.100.79             | IP address for the adapter.                                                                |
|                                           | 08 - [Subnet Cfg 1]<br>⋮<br>11 - [Subnet Cfg 4]   | 255.255.248.0            | Subnet mask for the adapter.                                                               |
|                                           | 23 - [DPI I/O Cfg]                                | xxx1 1111                | Enables Cmd/Ref and Datalinks A...D.                                                       |
|                                           | 35 - [M-S Input]                                  | xxx1 1111                | Configures the I/O Data to be transferred from the controller on the network to the drive. |
|                                           | 36 - [M-S Output]                                 | xxx1 1111                | Configures the I/O Data to be transferred from the drive to the controller on the network. |
|                                           |                                                   |                          |                                                                                            |

<sup>(1)</sup> In this example, the 20-COMM-E adapter/20-750-20COMM Option Card is installed in Port 6, and a 24V I/O module is installed in Port 5. Also, Data In B2...D2 (Parameters 898...902) and Data Out B2...D2 (Parameters 908...912) are enabled, but not used.



**TIP:** Data In parameters are inputs into the drive that come from controller outputs (for example, data to write to a drive parameter). Data Out parameters are outputs from the drive that go to controller inputs (for example, data to read a drive parameter).

► **TIP:** When using a drive that has 16-bit Datalinks (PowerFlex 70, PowerFlex 700, and PowerFlex 700H) to transfer a 32-bit parameter, two contiguous drive Datalink parameters (for example, Data Out A1/A2, B1/B2, etc.) are required. To determine if a parameter is a 32-bit parameter, see the Parameter section in the drive documentation and look for a  $\nabla^{32}$  symbol in the “No.” column. (All parameters in PowerFlex 700 Series B drives are 32-bit parameters.) For example, parameter 3 - [Output Current] in a PowerFlex 70 EC drive is a 32-bit parameter. When using a drive that has 32-bit Datalinks (PowerFlex 700 VC and PowerFlex 700S), only one drive Datalink parameter is required to transfer any parameter.

## Understanding Controller Data Table Addresses

Since PLC-5, SLC 500, and MicroLogix 1100/1400 controllers are 16-bit platforms and are used with the 32-bit 20-COMM-E adapter, the data will be transposed from the least-significant word (LSW) to the most-significant word (MSW) in the controller.

When the I/O was configured ([Chapter 4](#)), an available data table address (N20:0) was used. [Figure 5.12](#) shows the entire data file address structure for this example.

**Figure 5.12 Data File Table for Example Ladder Logic Program**

| Offset | 0 | 1    | 2     | 3     | 4 | 5 | 6 | 7 | 8 | 9 |
|--------|---|------|-------|-------|---|---|---|---|---|---|
| N20:0  | 5 | 3855 | 0     | 15123 | 0 | 0 | 0 | 0 | 0 | 0 |
| N20:10 | 0 | 0    | 0     | 0     | 0 | 0 | 0 | 0 | 0 | 0 |
| N20:20 | 2 | 0    | 15123 | 0     | 0 | 0 | 0 | 0 | 0 | 0 |
| N20:30 | 0 | 0    | 0     | 0     | 0 | 0 | 0 | 0 | 0 | 0 |

Below the table, there is a text field containing 'N20:0', a 'Radix' dropdown set to 'Decimal', a 'Symbol' field, a 'Desc' field, and a dropdown menu currently showing 'N20'. At the bottom are buttons for 'Properties', 'Usage', and 'Help'.

**Important:** The N20:0 data table address in this example is used to set a control timeout value (in seconds) which determines how long it will take the adapter to detect a communication loss. Enter a valid value (1...32767) for N20:0. A value of zero (0) is not valid, since it disables the timeout and all I/O connections (Logic Command/Status, Reference/Feedback, and Datalinks) intended for the drive will not execute. A timeout value of 5...20 seconds is recommended.

Depending on the drive you are using, [Table 5.G](#), [Table 5.H](#), [Table 5.I](#), or [Table 5.J](#) show the I/O definitions as they relate to the N20:0 data table address ([Figure 5.12](#)) being used in this example.

When using PowerFlex 70 SC or 70 EC, PowerFlex 700 SC, PowerFlex 700H drives or SMC Flex, which all contain INT (16-bit format) data types, you will read from and write to the MSW data table address in the controller.

When using PowerFlex 700 VC drives, which contain DINT (32-bit format) data types, you will read from and write to the LSW data table address in the controller.

When using PowerFlex 700S and PowerFlex 750-Series drives, which contain both DINT (32-bit format) and REAL (floating point format) data types, you will always read from and write to the LSW data table address in the controller first. Then if the data value exceeds 16 bits, the remaining value will be in the MSW data table address.

**Table 5.G Controller Data Table Addresses for PowerFlex 70 SC/EC, PowerFlex 700 SC, and PowerFlex 700H Drives, and SMC Flex**

| Data Table Address | Description                                                    |
|--------------------|----------------------------------------------------------------|
| N20:1              | Logic Status (see <a href="#">Appendix D</a> )                 |
| N20:2              | Reserved                                                       |
| N20:3              | Speed Feedback                                                 |
| N20:4              | Value of parameter assigned to Parameter 310 [Data Out A1] LSW |
| N20:5              | Value of parameter assigned to Parameter 310 [Data Out A1] MSW |
| N20:6              | Value of parameter assigned to Parameter 311 [Data Out A2] LSW |
| N20:7              | Value of parameter assigned to Parameter 311 [Data Out A2] MSW |
| N20:8              | Value of parameter assigned to Parameter 312 [Data Out B1] LSW |
| N20:9              | Value of parameter assigned to Parameter 312 [Data Out B1] MSW |
| N20:10             | Value of parameter assigned to Parameter 313 [Data Out B2] LSW |
| N20:11             | Value of parameter assigned to Parameter 313 [Data Out B2] MSW |
| N20:12             | Value of parameter assigned to Parameter 314 [Data Out C1] LSW |
| N20:13             | Value of parameter assigned to Parameter 314 [Data Out C1] MSW |
| N20:14             | Value of parameter assigned to Parameter 315 [Data Out C2] LSW |
| N20:15             | Value of parameter assigned to Parameter 315 [Data Out C2] MSW |
| N20:16             | Value of parameter assigned to Parameter 316 [Data Out D1] LSW |
| N20:17             | Value of parameter assigned to Parameter 316 [Data Out D1] MSW |
| N20:18             | Value of parameter assigned to Parameter 317 [Data Out D2] LSW |
| N20:19             | Value of parameter assigned to Parameter 317 [Data Out D2] MSW |
| N20:20             | Logic Command (see <a href="#">Appendix D</a> )                |
| N20:21             | Reserved                                                       |
| N20:22             | Speed Reference                                                |
| N20:23             | Value of parameter assigned to Parameter 300 [Data In A1] LSW  |
| N20:24             | Value of parameter assigned to Parameter 300 [Data In A1] MSW  |
| N20:25             | Value of parameter assigned to Parameter 301 [Data In A2] LSW  |
| N20:26             | Value of parameter assigned to Parameter 301 [Data In A2] MSW  |
| N20:27             | Value of parameter assigned to Parameter 302 [Data In B1] LSW  |
| N20:28             | Value of parameter assigned to Parameter 302 [Data In B1] MSW  |
| N20:29             | Value of parameter assigned to Parameter 303 [Data In B2] LSW  |
| N20:30             | Value of parameter assigned to Parameter 303 [Data In B2] MSW  |
| N20:31             | Value of parameter assigned to Parameter 304 [Data In C1] LSW  |
| N20:32             | Value of parameter assigned to Parameter 304 [Data In C1] MSW  |
| N20:33             | Value of parameter assigned to Parameter 305 [Data In C2] LSW  |
| N20:34             | Value of parameter assigned to Parameter 305 [Data In C2] MSW  |
| N20:35             | Value of parameter assigned to Parameter 306 [Data In D1] LSW  |
| N20:36             | Value of parameter assigned to Parameter 306 [Data In D1] MSW  |
| N20:37             | Value of parameter assigned to Parameter 307 [Data In D2] LSW  |
| N20:38             | Value of parameter assigned to Parameter 307 [Data In D2] MSW  |

**Table 5.H Controller Data Table Addresses for PowerFlex 700 VC Drives**

| <b>Data Table Address</b> | <b>Description</b>                                             |
|---------------------------|----------------------------------------------------------------|
| N20:1                     | Logic Status (see <a href="#">Appendix D</a> )                 |
| N20:2                     | Reserved                                                       |
| N20:3                     | Speed Feedback                                                 |
| N20:4                     | Value of parameter assigned to Parameter 310 [Data Out A1] LSW |
| N20:5                     | Value of parameter assigned to Parameter 310 [Data Out A1] MSW |
| N20:6                     | Value of parameter assigned to Parameter 311 [Data Out A2] LSW |
| N20:7                     | Value of parameter assigned to Parameter 311 [Data Out A2] MSW |
| N20:8                     | Value of parameter assigned to Parameter 312 [Data Out B1] LSW |
| N20:9                     | Value of parameter assigned to Parameter 312 [Data Out B1] MSW |
| N20:10                    | Value of parameter assigned to Parameter 313 [Data Out B2] LSW |
| N20:11                    | Value of parameter assigned to Parameter 313 [Data Out B2] MSW |
| N20:12                    | Value of parameter assigned to Parameter 314 [Data Out C1] LSW |
| N20:13                    | Value of parameter assigned to Parameter 314 [Data Out C1] MSW |
| N20:14                    | Value of parameter assigned to Parameter 315 [Data Out C2] LSW |
| N20:15                    | Value of parameter assigned to Parameter 315 [Data Out C2] MSW |
| N20:16                    | Value of parameter assigned to Parameter 316 [Data Out D1] LSW |
| N20:17                    | Value of parameter assigned to Parameter 316 [Data Out D1] MSW |
| N20:18                    | Value of parameter assigned to Parameter 317 [Data Out D2] LSW |
| N20:19                    | Value of parameter assigned to Parameter 317 [Data Out D2] MSW |
| N20:20                    | Logic Command (see <a href="#">Appendix D</a> )                |
| N20:21                    | Reserved                                                       |
| N20:22                    | Speed Reference                                                |
| N20:23                    | Value of parameter assigned to Parameter 300 [Data In A1] LSW  |
| N20:24                    | Value of parameter assigned to Parameter 300 [Data In A1] MSW  |
| N20:25                    | Value of parameter assigned to Parameter 301 [Data In A2] LSW  |
| N20:26                    | Value of parameter assigned to Parameter 301 [Data In A2] MSW  |
| N20:27                    | Value of parameter assigned to Parameter 302 [Data In B1] LSW  |
| N20:28                    | Value of parameter assigned to Parameter 302 [Data In B1] MSW  |
| N20:29                    | Value of parameter assigned to Parameter 303 [Data In B2] LSW  |
| N20:30                    | Value of parameter assigned to Parameter 303 [Data In B2] MSW  |
| N20:31                    | Value of parameter assigned to Parameter 304 [Data In C1] LSW  |
| N20:32                    | Value of parameter assigned to Parameter 304 [Data In C1] MSW  |
| N20:33                    | Value of parameter assigned to Parameter 305 [Data In C2] LSW  |
| N20:34                    | Value of parameter assigned to Parameter 305 [Data In C2] MSW  |
| N20:35                    | Value of parameter assigned to Parameter 306 [Data In D1] LSW  |
| N20:36                    | Value of parameter assigned to Parameter 306 [Data In D1] MSW  |
| N20:37                    | Value of parameter assigned to Parameter 307 [Data In D2] LSW  |
| N20:38                    | Value of parameter assigned to Parameter 307 [Data In D2] MSW  |

**Table 5.1 Controller Data Table Addresses for PowerFlex 700S Drives with Phase I Control**

| <b>Data Table Address</b> | <b>Description</b>                                                 |
|---------------------------|--------------------------------------------------------------------|
| N20:1                     | Logic Status (see <a href="#">Appendix D</a> )                     |
| N20:2                     | Speed Feedback LSW                                                 |
| N20:3                     | Speed Feedback MSW                                                 |
| N20:4                     | Value of parameter assigned to Parameter 724/725 [Data Out A1] LSW |
| N20:5                     | Value of parameter assigned to Parameter 724/725 [Data Out A1] MSW |
| N20:6                     | Value of parameter assigned to Parameter 726/727 [Data Out A2] LSW |
| N20:7                     | Value of parameter assigned to Parameter 726/727 [Data Out A2] MSW |
| N20:8                     | Value of parameter assigned to Parameter 728/729 [Data Out B1] LSW |
| N20:9                     | Value of parameter assigned to Parameter 728/729 [Data Out B1] MSW |
| N20:10                    | Value of parameter assigned to Parameter 730/731 [Data Out B2] LSW |
| N20:11                    | Value of parameter assigned to Parameter 730/731 [Data Out B2] MSW |
| N20:12                    | Value of parameter assigned to Parameter 732/733 [Data Out C1] LSW |
| N20:13                    | Value of parameter assigned to Parameter 732/733 [Data Out C1] MSW |
| N20:14                    | Value of parameter assigned to Parameter 734/735 [Data Out C2] LSW |
| N20:15                    | Value of parameter assigned to Parameter 734/735 [Data Out C2] MSW |
| N20:16                    | Value of parameter assigned to Parameter 736/737 [Data Out D1] LSW |
| N20:17                    | Value of parameter assigned to Parameter 736/737 [Data Out D1] MSW |
| N20:18                    | Value of parameter assigned to Parameter 738/739 [Data Out D2] LSW |
| N20:19                    | Value of parameter assigned to Parameter 738/739 [Data Out D2] MSW |
| N20:20                    | Logic Command (see <a href="#">Appendix D</a> )                    |
| N20:21                    | Speed Reference LSW                                                |
| N20:22                    | Speed Reference MSW                                                |
| N20:23                    | Value of parameter assigned to Parameter 707/708 [Data In A1] LSW  |
| N20:24                    | Value of parameter assigned to Parameter 707/708 [Data In A1] MSW  |
| N20:25                    | Value of parameter assigned to Parameter 709/710 [Data In A2] LSW  |
| N20:26                    | Value of parameter assigned to Parameter 709/710 [Data In A2] MSW  |
| N20:27                    | Value of parameter assigned to Parameter 711/712 [Data In B1] LSW  |
| N20:28                    | Value of parameter assigned to Parameter 711/712 [Data In B1] MSW  |
| N20:29                    | Value of parameter assigned to Parameter 713/714 [Data In B2] LSW  |
| N20:30                    | Value of parameter assigned to Parameter 713/714 [Data In B2] MSW  |
| N20:31                    | Value of parameter assigned to Parameter 715/716 [Data In C1] LSW  |
| N20:32                    | Value of parameter assigned to Parameter 715/716 [Data In C1] MSW  |
| N20:33                    | Value of parameter assigned to Parameter 717/718 [Data In C2] LSW  |
| N20:34                    | Value of parameter assigned to Parameter 717/718 [Data In C2] MSW  |
| N20:35                    | Value of parameter assigned to Parameter 719/720 [Data In D1] LSW  |
| N20:36                    | Value of parameter assigned to Parameter 719/720 [Data In D1] MSW  |
| N20:37                    | Value of parameter assigned to Parameter 721/722 [Data In D2] LSW  |
| N20:38                    | Value of parameter assigned to Parameter 721/722 [Data In D2] MSW  |

**Table 5.J Controller Data Table Addresses for PowerFlex 700S Drives with Phase II Control**

| <b>Data Table Address</b> | <b>Description</b>                                                 |
|---------------------------|--------------------------------------------------------------------|
| N20:1                     | Logic Status (see <a href="#">Appendix D</a> )                     |
| N20:2                     | Speed Feedback LSW                                                 |
| N20:3                     | Speed Feedback MSW                                                 |
| N20:4                     | Value of parameter assigned to Parameter 660 [DPI Data Out A1] LSW |
| N20:5                     | Value of parameter assigned to Parameter 660 [DPI Data Out A1] MSW |
| N20:6                     | Value of parameter assigned to Parameter 661 [DPI Data Out A2] LSW |
| N20:7                     | Value of parameter assigned to Parameter 661 [DPI Data Out A2] MSW |
| N20:8                     | Value of parameter assigned to Parameter 662 [DPI Data Out B1] LSW |
| N20:9                     | Value of parameter assigned to Parameter 662 [DPI Data Out B1] MSW |
| N20:10                    | Value of parameter assigned to Parameter 663 [DPI Data Out B2] LSW |
| N20:11                    | Value of parameter assigned to Parameter 663 [DPI Data Out B2] MSW |
| N20:12                    | Value of parameter assigned to Parameter 664 [DPI Data Out C1] LSW |
| N20:13                    | Value of parameter assigned to Parameter 664 [DPI Data Out C1] MSW |
| N20:14                    | Value of parameter assigned to Parameter 665 [DPI Data Out C2] LSW |
| N20:15                    | Value of parameter assigned to Parameter 665 [DPI Data Out C2] MSW |
| N20:16                    | Value of parameter assigned to Parameter 666 [DPI Data Out D1] LSW |
| N20:17                    | Value of parameter assigned to Parameter 666 [DPI Data Out D1] MSW |
| N20:18                    | Value of parameter assigned to Parameter 667 [DPI Data Out D2] LSW |
| N20:19                    | Value of parameter assigned to Parameter 667 [DPI Data Out D2] MSW |
| N20:20                    | Logic Command (see <a href="#">Appendix D</a> )                    |
| N20:21                    | Speed Reference LSW                                                |
| N20:22                    | Speed Reference MSW                                                |
| N20:23                    | Value of parameter assigned to Parameter 651 [DPI Data In A1] LSW  |
| N20:24                    | Value of parameter assigned to Parameter 651 [DPI Data In A1] MSW  |
| N20:25                    | Value of parameter assigned to Parameter 652 [DPI Data In A2] LSW  |
| N20:26                    | Value of parameter assigned to Parameter 652 [DPI Data In A2] MSW  |
| N20:27                    | Value of parameter assigned to Parameter 653 [DPI Data In B1] LSW  |
| N20:28                    | Value of parameter assigned to Parameter 653 [DPI Data In B1] MSW  |
| N20:29                    | Value of parameter assigned to Parameter 654 [DPI Data In B2] LSW  |
| N20:30                    | Value of parameter assigned to Parameter 654 [DPI Data In B2] MSW  |
| N20:31                    | Value of parameter assigned to Parameter 655 [DPI Data In C1] LSW  |
| N20:32                    | Value of parameter assigned to Parameter 655 [DPI Data In C1] MSW  |
| N20:33                    | Value of parameter assigned to Parameter 656 [DPI Data In C2] LSW  |
| N20:34                    | Value of parameter assigned to Parameter 656 [DPI Data In C2] MSW  |
| N20:35                    | Value of parameter assigned to Parameter 657 [DPI Data In D1] LSW  |
| N20:36                    | Value of parameter assigned to Parameter 657 [DPI Data In D1] MSW  |
| N20:37                    | Value of parameter assigned to Parameter 658 [DPI Data In D2] LSW  |
| N20:38                    | Value of parameter assigned to Parameter 658 [DPI Data In D2] MSW  |

**Table 5.K Controller Data Table Addresses for PowerFlex 750-Series Drives**

| Data Table Address | Description                                                    |
|--------------------|----------------------------------------------------------------|
| N20:1              | Logic Status (see <a href="#">Appendix D</a> )                 |
| N20:2              | Speed Feedback LSW                                             |
| N20:3              | Speed Feedback MSW                                             |
| N20:4              | Value of parameter assigned to Parameter 905 [Data Out A1] LSW |
| N20:5              | Value of parameter assigned to Parameter 905 [Data Out A1] MSW |
| N20:6              | Value of parameter assigned to Parameter 906 [Data Out A2] LSW |
| N20:7              | Value of parameter assigned to Parameter 906 [Data Out A2] MSW |
| N20:8              | Value of parameter assigned to Parameter 907 [Data Out B1] LSW |
| N20:9              | Value of parameter assigned to Parameter 907 [Data Out B1] MSW |
| N20:10             | Value of parameter assigned to Parameter 908 [Data Out B2] LSW |
| N20:11             | Value of parameter assigned to Parameter 908 [Data Out B2] MSW |
| N20:12             | Value of parameter assigned to Parameter 909 [Data Out C1] LSW |
| N20:13             | Value of parameter assigned to Parameter 909 [Data Out C1] MSW |
| N20:14             | Value of parameter assigned to Parameter 910 [Data Out C2] LSW |
| N20:15             | Value of parameter assigned to Parameter 910 [Data Out C2] MSW |
| N20:16             | Value of parameter assigned to Parameter 911 [Data Out D1] LSW |
| N20:17             | Value of parameter assigned to Parameter 911 [Data Out D1] MSW |
| N20:18             | Value of parameter assigned to Parameter 912 [Data Out D2] LSW |
| N20:19             | Value of parameter assigned to Parameter 912 [Data Out D2] MSW |
| N20:20             | Logic Command (see <a href="#">Appendix D</a> )                |
| N20:21             | Speed Reference LSW                                            |
| N20:22             | Speed Reference MSW                                            |
| N20:23             | Value of parameter assigned to Parameter 895 [Data In A1] LSW  |
| N20:24             | Value of parameter assigned to Parameter 895 [Data In A1] MSW  |
| N20:25             | Value of parameter assigned to Parameter 896 [Data In A2] LSW  |
| N20:26             | Value of parameter assigned to Parameter 896 [Data In A2] MSW  |
| N20:27             | Value of parameter assigned to Parameter 897 [Data In B1] LSW  |
| N20:28             | Value of parameter assigned to Parameter 897 [Data In B1] MSW  |
| N20:29             | Value of parameter assigned to Parameter 898 [Data In B2] LSW  |
| N20:30             | Value of parameter assigned to Parameter 898 [Data In B2] MSW  |
| N20:31             | Value of parameter assigned to Parameter 899 [Data In C1] LSW  |
| N20:32             | Value of parameter assigned to Parameter 899 [Data In C1] MSW  |
| N20:33             | Value of parameter assigned to Parameter 900 [Data In C2] LSW  |
| N20:34             | Value of parameter assigned to Parameter 900 [Data In C2] MSW  |
| N20:35             | Value of parameter assigned to Parameter 901 [Data In D1] LSW  |
| N20:36             | Value of parameter assigned to Parameter 901 [Data In D1] MSW  |
| N20:37             | Value of parameter assigned to Parameter 902 [Data In D2] LSW  |
| N20:38             | Value of parameter assigned to Parameter 902 [Data In D2] MSW  |

You can use the controller data table addresses to directly control and monitor the drive without creating any ladder logic program. However, if you intend to use Human Machine Interface devices (PanelView, etc.) to operate the drive and view its status, you will need to create descriptive controller data table addresses ([Table 5.L](#) and [Table 5.M](#)) and a ladder logic program that will pass that data to the data table addresses used for messaging.

**Table 5.L Controller and Program Data Table Address Descriptions for Example Logic Status/Feedback Ladder Logic Program**

| Description            | Controller Data Table Address | Description     | Program Data Table Address |
|------------------------|-------------------------------|-----------------|----------------------------|
| Drive Ready            | N20:1/0                       | Status Ready    | B3:1/0                     |
| Drive Active           | N20:1/1                       | Status Active   | B3:1/1                     |
| Actual Direction (XIO) | N20:1/3                       | Status Forward  | B3:1/3                     |
| Actual Direction (XIC) | N20:1/3                       | Status Reverse  | B3:1/4                     |
| Drive Faulted          | N20:1/7                       | Status Faulted  | B3:1/7                     |
| Drive At Speed         | N20:1/8                       | Status At Speed | B3:1/8                     |
| Speed Feedback         | N20:3                         | Speed Feedback  | B30:3                      |

**Table 5.M Program and Controller Data Table Address Descriptions for Example Logic Command/Reference Ladder Logic Program**

| Description                   | Program Data Table Address | Description        | Controller Data Table Address |
|-------------------------------|----------------------------|--------------------|-------------------------------|
| Command Stop                  | B3:20/0                    | Drive Stop         | N20:20/0                      |
| Command Start                 | B3:20/1                    | Drive Start        | N20:20/1                      |
| Command Jog                   | B3:20/2                    | Drive Jog          | N20:20/2                      |
| Command Clear Faults          | B3:20/3                    | Drive Clear Faults | N20:20/3                      |
| Command Forward Reverse (XIO) | B3:20/4                    | Drive Forward      | N20:20/4                      |
| Command Forward Reverse (XIC) | B3:20/4                    | Drive Reverse      | N20:20/5                      |
| Speed Reference               | N30:22                     | Speed Reference    | N20:22                        |

An example ladder logic program that uses these descriptive controller data table addresses and passes their data to the descriptive program data table addresses is shown in [Figure 5.13](#), [Figure 5.14](#), [Figure 5.15](#), and [Figure 5.16](#).

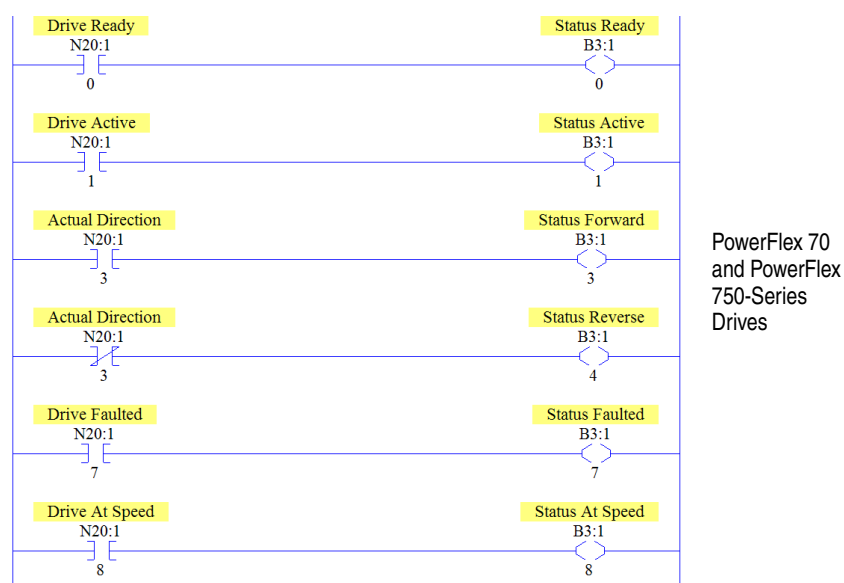
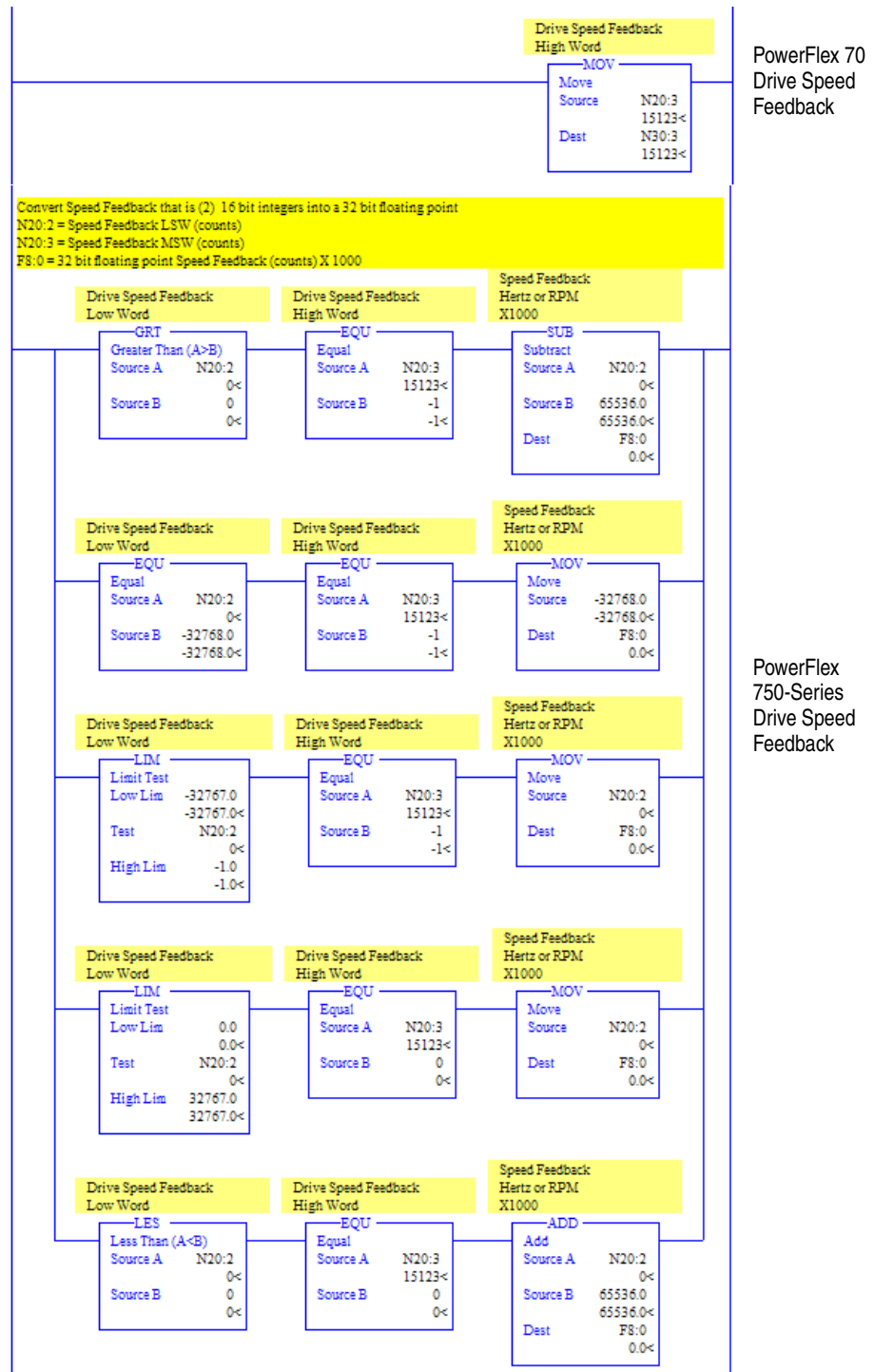
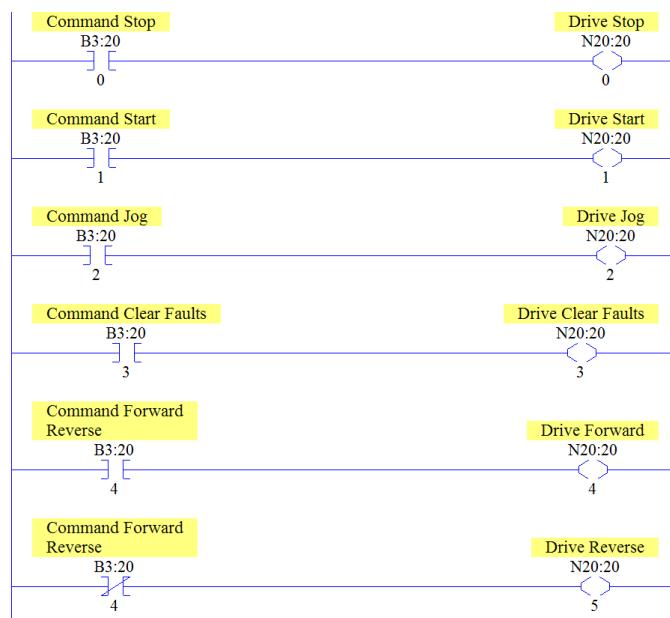
**Figure 5.13 PLC-5, SLC 500 or MicroLogix 1100/1400 Example Ladder Logic Program for Logic Status**

**Figure 5.14 PLC-5, SLC 500 or MicroLogix 1100/1400 Example Ladder Logic Program for Speed Feedback**



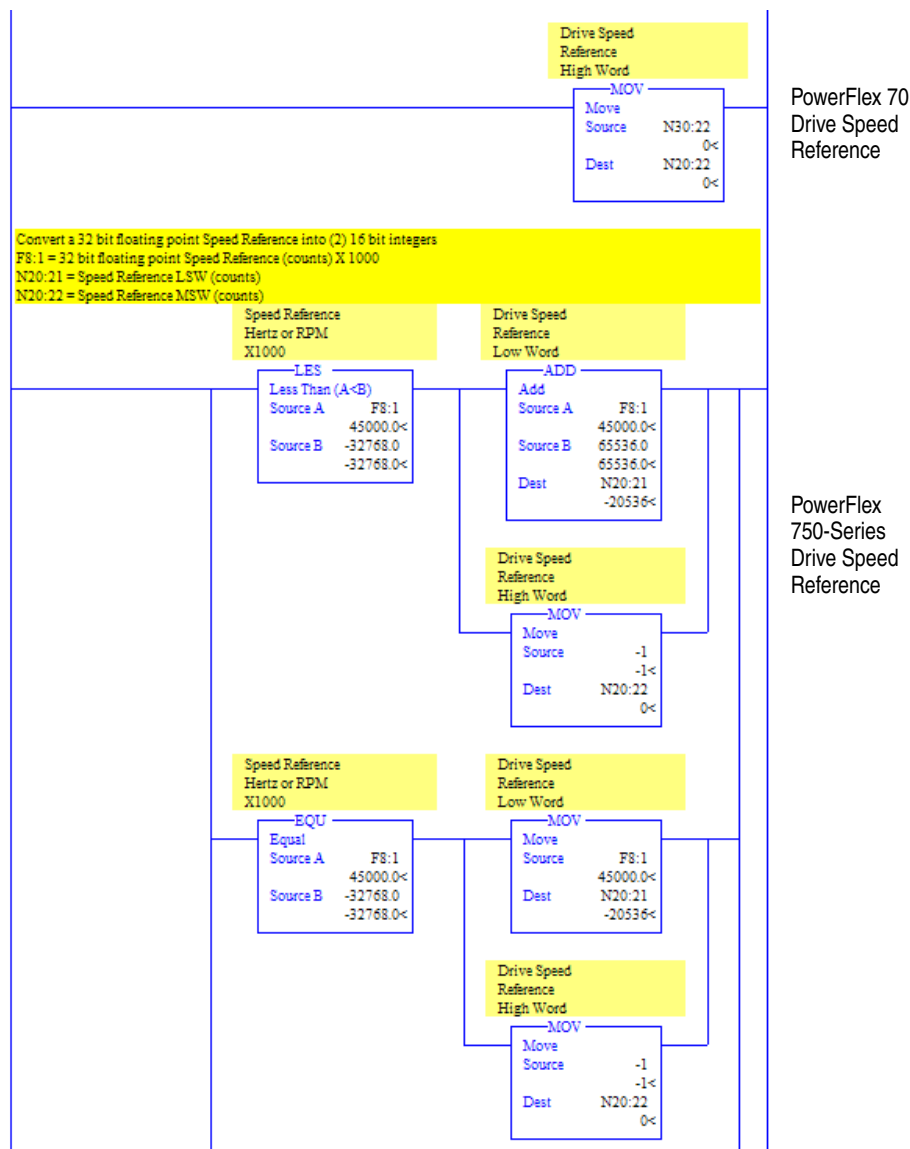
For information on speed Reference and Feedback scaling, see [PowerFlex 7-Class Drives \(except PowerFlex 750-Series\) on page 5-6](#) or [PowerFlex 750-Series Drives on page 5-7](#).

**Figure 5.15 PLC-5, SLC 500 or MicroLogix 1100/1400 Example Ladder Logic Program for Logic Command**

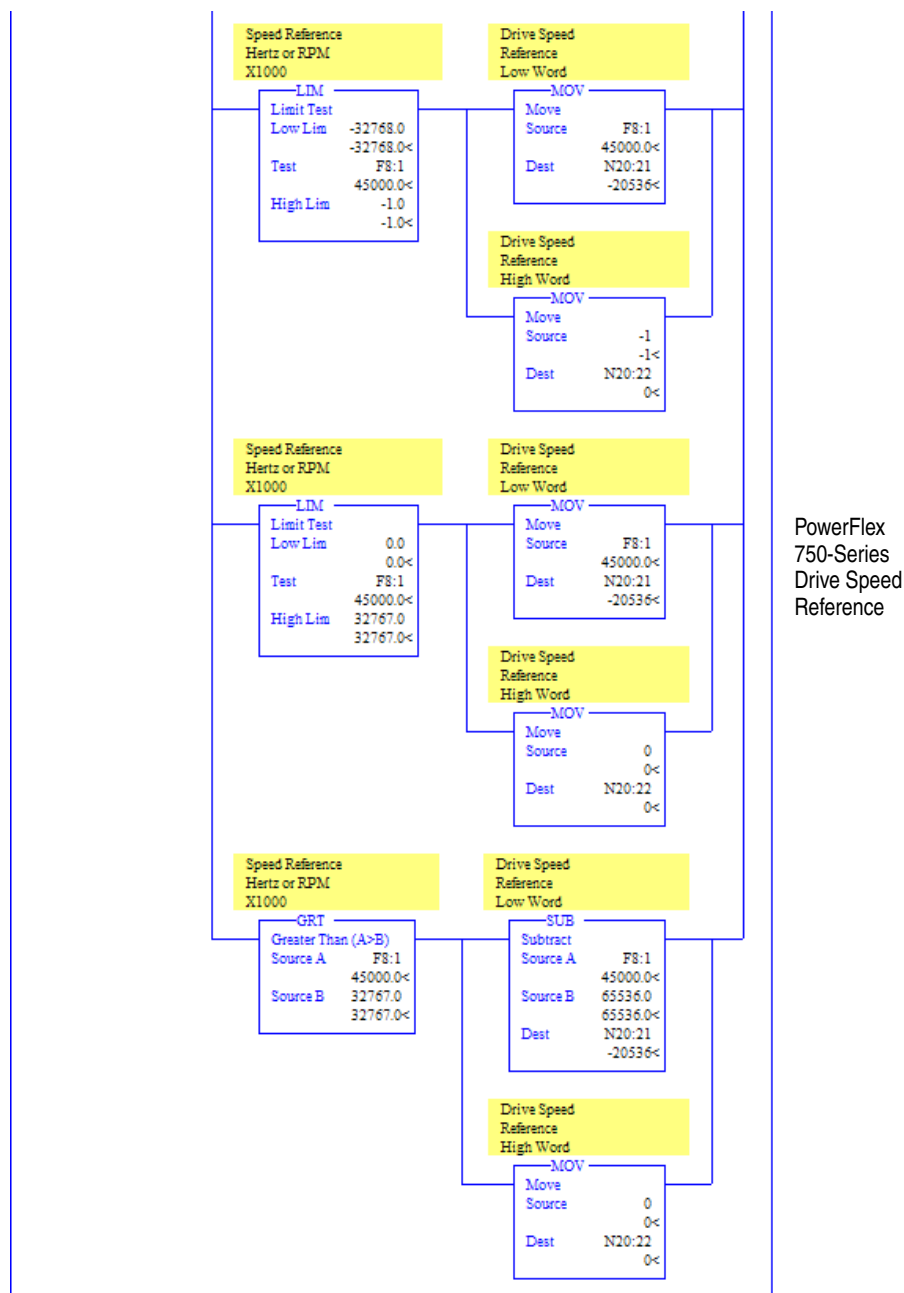


PowerFlex 70  
and PowerFlex  
750-Series  
Drives

**Figure 5.16 PLC-5, SLC 500 or MicroLogix 1100/1400 Example Ladder Logic Program for Speed Reference**



(Continued on next page.)



## Notes:

## Using Explicit Messaging

This chapter provides information and examples that explain how to use Explicit Messaging to configure and monitor the adapter and connected PowerFlex 7-Class drive or PowerFlex 750-Series drive.

**Important:** When used in a PowerFlex 750-Series drive, the 20-COMM-E adapter must have firmware version 4.001 (or later) to support explicit messaging to drive parameters (Port 0). Furthermore, the adapter requires firmware version 4.002 (or later) for explicit messaging to parameters of peripherals in drive Ports 1...14.

| Topic                                         | Page                 |
|-----------------------------------------------|----------------------|
| <a href="#">About Explicit Messaging</a>      | <a href="#">6-2</a>  |
| <a href="#">Performing Explicit Messages</a>  | <a href="#">6-3</a>  |
| <a href="#">ControlLogix Examples</a>         | <a href="#">6-4</a>  |
| <a href="#">PLC-5 Examples</a>                | <a href="#">6-23</a> |
| <a href="#">SLC 500 Examples</a>              | <a href="#">6-29</a> |
| <a href="#">MicroLogix 1100/1400 Examples</a> | <a href="#">6-53</a> |



**ATTENTION:** Risk of injury or equipment damage exists. The examples in this publication are intended solely for purposes of example. There are many variables and requirements with any application. Rockwell Automation, Inc. does not assume responsibility or liability (to include intellectual property liability) for actual use of the examples shown in this publication.



**ATTENTION:** Risk of equipment damage exists. If Explicit Messages are programmed to write parameter data to Non-Volatile Storage (NVS) frequently, the NVS will quickly exceed its life cycle and cause the drive to malfunction. Do not create a program that frequently uses Explicit Messages to write parameter data to NVS. Datalinks do not write to NVS and should be used for frequently changed parameters.

Refer to [Chapter 5](#) for information about the I/O Image, using Logic Command/Status, Reference/Feedback, and Datalinks.

## About Explicit Messaging

Explicit Messaging is used to transfer data that does not require continuous updates. With Explicit Messaging, you can configure and monitor a slave device's parameters on the network.

**Important:** When an explicit message is performed, by default no connection is made since it is an “unconnected” message. When timing of the message transaction is important, you can create a dedicated message connection between the controller and drive by checking the “Connected” box on the Communications tab message configuration screen during message setup. These message connections are in addition to the I/O connection. However, the trade off for more message connections is decreased network performance. If your application cannot tolerate this, do not check the “Connected” box, which is recommended.

**Important:** PowerFlex 7-Class and PowerFlex 750-Series drives have explicit messaging limitations. [Table 6.A](#) shows the EtherNet/IP Object Class code compatibilities for these drives.

**Table 6.A Explicit Messaging Class Code Compatibility with Drives**

| EtherNet/IP Object Class Code  | PowerFlex 7-Class Drives | PowerFlex 750-Series Drives            | Explicit Messaging Function                 |
|--------------------------------|--------------------------|----------------------------------------|---------------------------------------------|
| Parameter Object 0x0F          | Yes                      | No                                     | Single parameter reads/writes               |
| DPI Parameter Object 0x93      | Yes                      | Yes <sup>(1)</sup><br>with limitations | Single and scattered parameter reads/writes |
| Host DPI Parameter Object 0x9F | No                       | Yes <sup>(2)</sup><br>with limitations | Single and scattered parameter reads/writes |

<sup>(1)</sup> Enables access to drive parameters (Port 0), DPI device parameters (Ports 1...6 only), and Host parameters (Ports 7...14 only). For example, DPI Parameter Object Class code 0x93 can access a 20-COMM-E adapter in Port 6. However, Class code 0x93 cannot access, for example, the Host parameters in a 24V I/O option module in Port 5. See [DPI Parameter Object on page C-16](#) for instance (parameter) numbering.

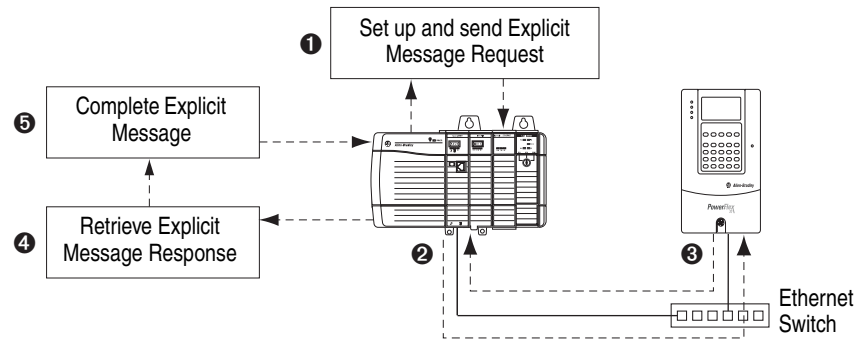
<sup>(2)</sup> Enables access to drive parameters (Port 0) and Host parameters for all ports (1...14). Host DPI Parameter Object Class code 0x9F cannot access DPI (device) parameters. For example, if a 20-750-DNET option module is in Port 4, its Host parameters can be accessed, but not its DPI (device) parameters. See [Host DPI Parameter Object on page C-30](#) for instance (parameter) numbering.

## Performing Explicit Messages

There are five basic events in the Explicit Messaging process. The details of each step will vary depending on the type of controller being used. Refer to the documentation for your controller.

**Important:** There must be a request message and a response message for all Explicit Messages, whether you are reading or writing data.

**Figure 6.1 Explicit Message Process**



| Event | Description                                                                                                                                      |
|-------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| ①     | You format the required data and set up the ladder logic program to send an Explicit Message request to the scanner or bridge module (download). |
| ②     | The scanner or bridge module transmits the Explicit Message Request to the slave device over the network.                                        |
| ③     | The slave device transmits the Explicit Message Response back to the scanner. The data is stored in the scanner buffer.                          |
| ④     | The controller retrieves the Explicit Message Response from the scanner's buffer (upload).                                                       |
| ⑤     | The Explicit Message is complete.                                                                                                                |

For information on the maximum number of Explicit Messages that can be executed at a time, refer to the user manual for the scanner or bridge and/or controller that is being used.

ControlLogix Examples

► **TIP:** To display the Message Configuration screen in RSLogix 5000, add a message instruction (MSG), create a new tag for the message (Properties: Base tag type, MESSAGE data type, controller scope), and click the  button in the message instruction.

For supported classes, instances, and attributes, refer to [Appendix C, EtherNet/IP Objects](#).

Explicit Messaging Using RSLogix 5000 Version 15 (or later)

ControlLogix Example Ladder Logic Program to Read a Single Parameter

A Parameter Read message is used to read a single parameter. This read message example reads the value of parameter 003 - [Output Current] in a PowerFlex 7-Class drive.

**Important:** Parameter Object Class code 0x0F is not supported in PowerFlex 750-Series drives. To do a single parameter read, follow the RSLogix 5000 (all versions) single read example on [page 6-19](#).

Table 6.B Example Controller Tags to Read a Single Parameter

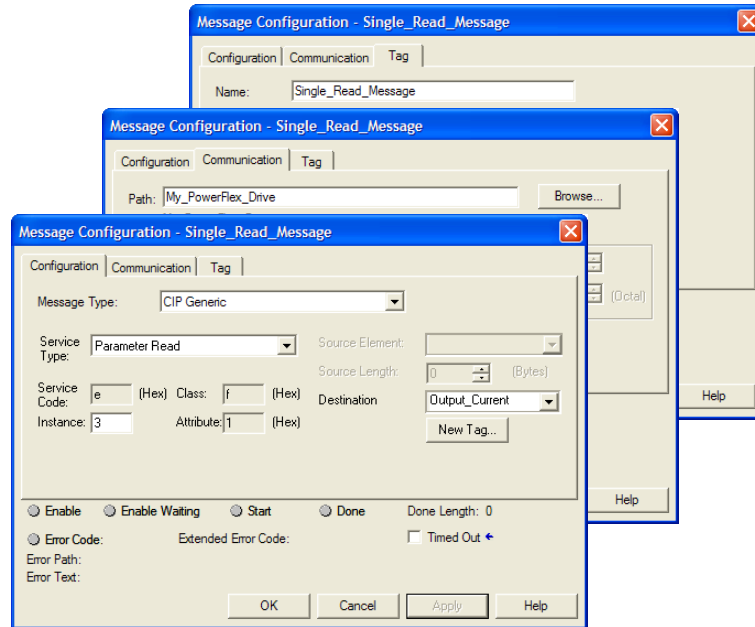
| Operand | Controller Tags for Single Read Message | Data Type |
|---------|-----------------------------------------|-----------|
| XIC     | Execute_Single_Read_Message             | BOOL      |
| MSG     | Single_Read_Message                     | MESSAGE   |

Figure 6.2 Example Ladder Logic to Read a Single Parameter



## ControlLogix – Formatting a Message to Read a Single Parameter (version 15 or later)

**Figure 6.3 Parameter Read Single Message Configuration Screens**



The following table identifies the data that is required in each box to configure a message to read a single parameter.

| Configuration Tab           | Example Value                 | Description                                         |
|-----------------------------|-------------------------------|-----------------------------------------------------|
| Message Type                | CIP Generic                   | Used to access the Parameter Object in the adapter. |
| Service Type <sup>(1)</sup> | Parameter Read                | This service is used to read a parameter value.     |
| Service Code <sup>(1)</sup> | e (Hex.)                      | Code for the requested service.                     |
| Class                       | f (Hex.)                      | Class ID for the DPI Parameter Object.              |
| Instance <sup>(2)</sup>     | 3 (Dec.)                      | Instance number is the same as parameter number.    |
| Attribute                   | 1 (Hex.)                      | Attribute number for the Parameter Value attribute. |
| Destination                 | Output_Current <sup>(4)</sup> | The tag where the data that is read is stored.      |
| Communication Tab           | Example Value                 | Description                                         |
| Path <sup>(3)</sup>         | My_PowerFlex_Drive            | The path is the route that the message will follow. |
| Tag Tab                     | Example Value                 | Description                                         |
| Name                        | Single_Read_Message           | The name for the message.                           |

<sup>(1)</sup> The default setting for Service Type is "Custom," enabling entry of a Service Code not available from the Service Type pull-down menu. When choosing a Service Type other than "Custom" from the pull-down menu, an appropriate Hex. value is automatically assigned to the Service Code box which is dimmed (unavailable).

<sup>(2)</sup> Only drive parameters (Port 0) can be read using Parameter Object Class code 0x0F. To read a parameter of a peripheral in another port, use DPI Parameter Object Class code 0x93 (see [page 6-19](#)).

<sup>(3)</sup> Click **Browse** to find the path, or type in the name of the device listed in the I/O Configuration folder.

<sup>(4)</sup> In this example, Output Current is a 32-bit parameter requiring the Data Type field to be set to "DINT" when creating the controller tag. If the parameter being read is a 16-bit parameter, the tag Data Type field must be set to "INT." When using a PowerFlex 700S drive, Output Current is a floating point parameter requiring the Data Type field to be set to "REAL" when creating the controller tag. See the drive documentation to determine the size of the parameter and its data type (16-bit or 32-bit integer or REAL).

ControlLogix Example Ladder Logic Program to Write a Single Parameter  
(version 15 or later)

A Parameter Write message is used to write to a single parameter. This write message example writes a value to parameter 140 - [Accel Time 1] in a PowerFlex 7-Class drive.

**Important:** Parameter Object Class code 0x0F is not supported in PowerFlex 750-Series drives. To do a single parameter write, follow the RSLogix 5000 (all versions) single write example on [page 6-21](#).

Table 6.C Example Controller Tags to Write a Single Parameter

| Operand | Controller Tags for Single Write Message | Data Type |
|---------|------------------------------------------|-----------|
| XIC     | Execute_Single_Write_Message             | BOOL      |
| MSG     | Single_Write_Message                     | MESSAGE   |

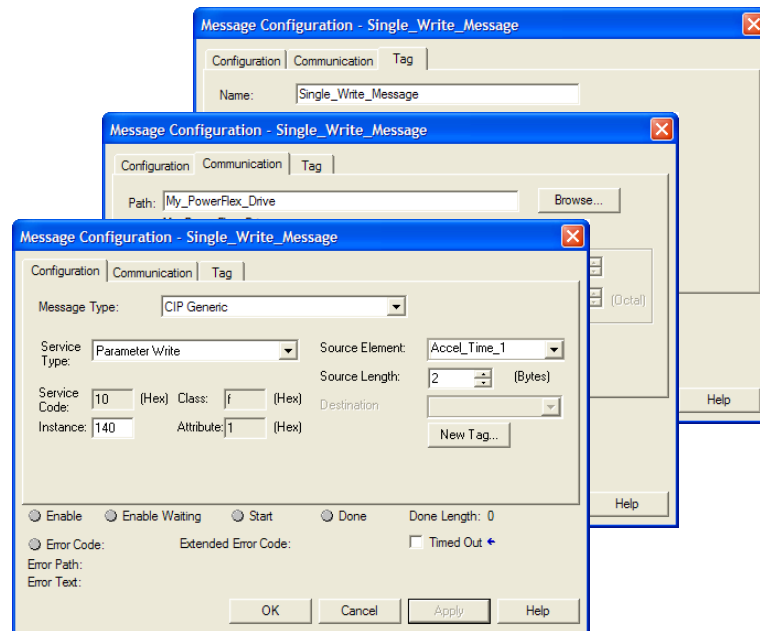
Figure 6.4 Example Ladder Logic to Write a Single Parameter



**Important:** If the explicit message single write must be written continuously, use DPI Parameter Object Class code 0x93 or Host DPI Parameter Object Class code 0x9F and attribute A (10 decimal; see [page 6-22](#)). This writes to RAM—not NVS (EEPROM) memory. This example single write message using Class code F writes to NVS. Over time, continuous writes will exceed the EEPROM life cycle and cause the drive to malfunction.

## ControlLogix – Formatting a Message to Write a Single Parameter (version 15 or later)

**Figure 6.5 Parameter Write Single Message Configuration Screens**



The following table identifies the data that is required in each box to configure a message to write a single parameter.

| Configuration Tab           | Example Value               | Description                                                                                      |
|-----------------------------|-----------------------------|--------------------------------------------------------------------------------------------------|
| Message Type                | CIP Generic                 | Used to access the Parameter Object in the adapter.                                              |
| Service Type <sup>(1)</sup> | Parameter Write             | This service is used to write a parameter value.                                                 |
| Service Code <sup>(1)</sup> | 10 (Hex.)                   | Code for the requested service.                                                                  |
| Class                       | f (Hex.)                    | Class ID for the DPI Parameter Object.                                                           |
| Instance <sup>(2)</sup>     | 140 (Dec.)                  | Instance number is the same as parameter number.                                                 |
| Attribute                   | 1 (Hex.)                    | Attribute number for the Parameter Value attribute.                                              |
| Source Element              | Accel_Time_1 <sup>(4)</sup> | Name of the tag for any service data to be sent from the scanner or bridge to the adapter/drive. |
| Source Length               | 2 <sup>(4)</sup>            | Number of bytes of service data to be sent in the message.                                       |
| Communication Tab           | Example Value               | Description                                                                                      |
| Path <sup>(3)</sup>         | My_PowerFlex_Drive          | The path is the route that the message will follow.                                              |
| Tag Tab                     | Example Value               | Description                                                                                      |
| Name                        | Single_Write_Message        | The name for the message.                                                                        |

<sup>(1)</sup> The default setting for Service Type is "Custom," enabling entry of a Service Code not available from the Service Type pull-down menu. When choosing a Service Type other than "Custom" from the pull-down menu, an appropriate Hex. value is automatically assigned to the Service Code box which is dimmed (unavailable).

<sup>(2)</sup> Only drive parameters (Port 0) can be written to using Parameter Object Class code 0x0F. To write to a parameter of a peripheral in another port, use DPI Parameter Object Class code 0x93 (see [page 6-21](#)).

<sup>(3)</sup> Click **Browse** to find the path, or type in the name of the device listed in the I/O Configuration folder.

<sup>(4)</sup> In this example, Accel Time 1 is a 16-bit parameter requiring the tag Data Type field to be set to "INT" when creating the controller tag. If the parameter being written to is a 32-bit parameter, the tag Data Type field must be set to "DINT." Also, the Source Length field on the Message Configuration screen must correspond to the selected Data Type in bytes (for example, 4 bytes for a DINT or a REAL). When using a PowerFlex 700S drive, Accel Time 1 is a floating point number requiring the Data Type field to be set to "REAL" when creating the controller tag. See the drive documentation to determine the size of the parameter and its data type (16-bit or 32-bit integer or REAL).

ControlLogix Example Ladder Logic Program to Read Multiple Parameters  
(all versions)

A Scattered Read message is used to read the values of multiple parameters. Up to 22 parameters can be read. This read message example reads the values of these five parameters:

| PowerFlex 7-Class Drive                                                                                                                                                                                                                                       | PowerFlex 750-Series Drive                                                                                                                                                                                                                                                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"><li>• Parameter 001 - [Output Freq]</li><li>• Parameter 003 - [Output Current]</li><li>• Parameter 006 - [Output Voltage]</li><li>• Parameter 012 - [DC Bus Voltage]</li><li>• Parameter 017 - [Analog In1 Value]</li></ul> | <ul style="list-style-type: none"><li>• Parameter 001 - [Output Freq]</li><li>• Parameter 007 - [Output Current]</li><li>• Parameter 137 - [Open Loop Fdbk]</li><li>• Parameter 21581 - [Port 5: Analog Out 0 Data]</li><li>• Parameter 260 - [Analog In0 Value]</li></ul> |

Refer to [DPI Parameter Object on page C-16](#) (Class code 0x93) or [Host DPI Parameter Object on page C-30](#) (Class code 0x9F) for parameter numbering.

**Important:** See [Table 6.A on page 6-2](#) for limitations of PowerFlex 7-Class and PowerFlex 750-Series drives when using Class code 0x93 or Class code 0x9F for explicit messaging.

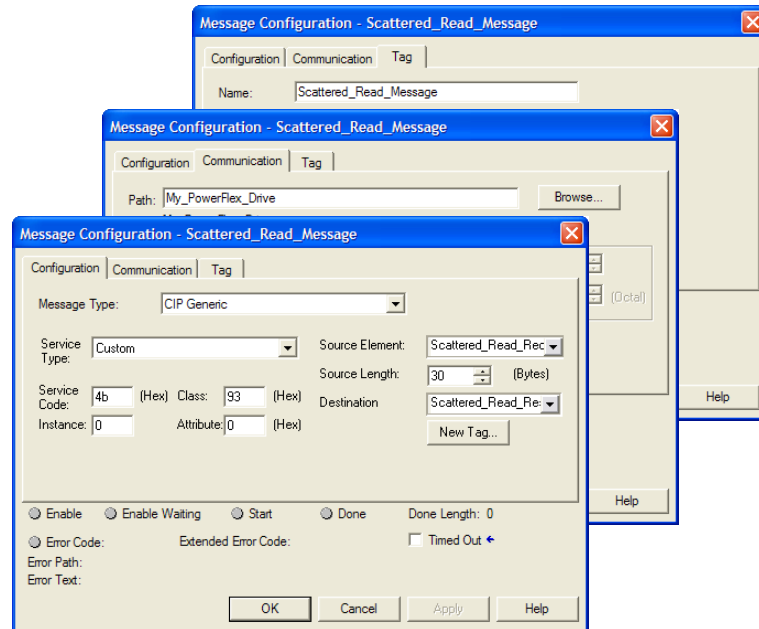
Table 6.D Example Controller Tags to Read Multiple Parameters

| Operand | Controller Tags for Read Multiple Message | Data Type |
|---------|-------------------------------------------|-----------|
| XIC     | Execute_Scattered_Read_Message            | BOOL      |
| MSG     | Scattered_Read_Message                    | MESSAGE   |

Figure 6.6 Example Ladder Logic to Read Multiple Parameters



## ControlLogix – Formatting a Message to Read Multiple Parameters (all versions)

**Figure 6.7 Scattered Read Message Configuration Screens**

The following table identifies the data that is required in each box to configure a message to read multiple parameters.

| Configuration Tab           | Example Value                         | Description                                                                                  |
|-----------------------------|---------------------------------------|----------------------------------------------------------------------------------------------|
| Message Type                | CIP Generic                           | Used to access Parameter Object in the adapter.                                              |
| Service Type <sup>(1)</sup> | Custom                                | Required for scattered messages.                                                             |
| Service Code <sup>(1)</sup> | 4b (Hex.)                             | Code for the requested service.                                                              |
| Class                       | 93 or 9F (Hex.) <sup>(3)</sup>        | Class ID for the DPI Parameter Object.                                                       |
| Instance                    | 0 (Dec.)                              | Required for scattered messages.                                                             |
| Attribute                   | 0 (Hex.)                              | Required for scattered messages.                                                             |
| Source Element              | Scattered_Read_Request <sup>(4)</sup> | Name of the tag for any service data to be sent from scanner or bridge to the adapter/drive. |
| Source Length               | 30 <sup>(4)</sup>                     | Number of bytes of service data to be sent in the message.                                   |
| Destination                 | Scattered_Read_Response               | The tag where the data that is read is stored.                                               |
| Communication Tab           | Example Value                         | Description                                                                                  |
| Path <sup>(2)</sup>         | My_PowerFlex_Drive                    | The path is the route that the message will follow.                                          |
| Tag Tab                     | Example Value                         | Description                                                                                  |
| Name                        | Scattered_Read_Message                | The name for the message.                                                                    |

<sup>(1)</sup> The default setting for Service Type is "Custom," enabling entry of a Service Code not available from the Service Type pull-down menu. When choosing a Service Type other than "Custom" from the pull-down menu, an appropriate Hex. value is automatically assigned to the Service Code box which is dimmed (unavailable).

<sup>(2)</sup> Click **Browse** to find the path, or type in the name of the device listed in the I/O Configuration folder.

<sup>(3)</sup> See [Table 6.A on page 6-2](#) for limitations of PowerFlex 7-Class and PowerFlex 750-Series drives when using DPI Parameter Object Class code 0x93 or Host DPI Parameter Object Class code 0x9F for explicit messaging.

<sup>(4)</sup> In this example, we are reading five parameters. Each parameter being read requires an array of three INT registers. Therefore, a controller tag was created with its Data Type field set to "INT[15]." Also, the Source Length field on the Message Configuration screen must correspond to the selected Data Type in bytes (for this example, 30 bytes for an INT[15] array). Scattered read messages always assume that every parameter being read is a 32-bit parameter, regardless of its actual size. Maximum length is 132 bytes or 66 words which equates to 22 parameters. For parameter numbering, see [DPI Parameter Object on page C-16](#) (Class code 0x93) or [Host DPI Parameter Object on page C-30](#) (Class code 0x9F).

### ControlLogix Example Scattered Read Request Data

In this message example, we use the data structure in [Figure 6.8](#) or [Figure 6.9](#) in the source tag named Scattered\_Read\_Request to read these five parameters:

| PowerFlex 7-Class Drive                                                                                                                                                                                                                                             | PowerFlex 750-Series Drive                                                                                                                                                                                                                                                       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Parameter 001 - [Output Freq]</li> <li>• Parameter 003 - [Output Current]</li> <li>• Parameter 006 - [Output Voltage]</li> <li>• Parameter 012 - [DC Bus Voltage]</li> <li>• Parameter 017 - [Analog In1 Value]</li> </ul> | <ul style="list-style-type: none"> <li>• Parameter 001 - [Output Freq]</li> <li>• Parameter 007 - [Output Current]</li> <li>• Parameter 137 - [Open Loop Fdbk]</li> <li>• Parameter 21581 - [Port 5: Analog Out 0 Data]</li> <li>• Parameter 260 - [Analog In0 Value]</li> </ul> |

Refer to [DPI Parameter Object on page C-16](#) (Class code 0x93) or [Host DPI Parameter Object on page C-30](#) (Class code 0x9F) for parameter numbering.

**Figure 6.8 Example Scattered Read Request Data for PowerFlex 7-Class Drive**

| Name                       | Value | Data Type | Description                |
|----------------------------|-------|-----------|----------------------------|
| Scattered_Read_Request     | {...} | INT[15]   |                            |
| Scattered_Read_Request[0]  | 1     | INT       | Parameter Number (decimal) |
| Scattered_Read_Request[1]  | 0     | INT       | Pad Word                   |
| Scattered_Read_Request[2]  | 0     | INT       | Pad Word                   |
| Scattered_Read_Request[3]  | 3     | INT       | Parameter Number (decimal) |
| Scattered_Read_Request[4]  | 0     | INT       | Pad Word                   |
| Scattered_Read_Request[5]  | 0     | INT       | Pad Word                   |
| Scattered_Read_Request[6]  | 6     | INT       | Parameter Number (decimal) |
| Scattered_Read_Request[7]  | 0     | INT       | Pad Word                   |
| Scattered_Read_Request[8]  | 0     | INT       | Pad Word                   |
| Scattered_Read_Request[9]  | 12    | INT       | Parameter Number (decimal) |
| Scattered_Read_Request[10] | 0     | INT       | Pad Word                   |
| Scattered_Read_Request[11] | 0     | INT       | Pad Word                   |
| Scattered_Read_Request[12] | 17    | INT       | Parameter Number (decimal) |
| Scattered_Read_Request[13] | 0     | INT       | Pad Word                   |
| Scattered_Read_Request[14] | 0     | INT       | Pad Word                   |

**Figure 6.9 Example Scattered Read Request Data for PowerFlex 750-Series Drive**

| Name                       | Value | Data Type | Description                |
|----------------------------|-------|-----------|----------------------------|
| Scattered_Read_Request     | {...} | INT[15]   |                            |
| Scattered_Read_Request[0]  | 1     | INT       | Parameter Number (decimal) |
| Scattered_Read_Request[1]  | 0     | INT       | Pad Word                   |
| Scattered_Read_Request[2]  | 0     | INT       | Pad Word                   |
| Scattered_Read_Request[3]  | 7     | INT       | Parameter Number (decimal) |
| Scattered_Read_Request[4]  | 0     | INT       | Pad Word                   |
| Scattered_Read_Request[5]  | 0     | INT       | Pad Word                   |
| Scattered_Read_Request[6]  | 137   | INT       | Parameter Number (decimal) |
| Scattered_Read_Request[7]  | 0     | INT       | Pad Word                   |
| Scattered_Read_Request[8]  | 0     | INT       | Pad Word                   |
| Scattered_Read_Request[9]  | 21581 | INT       | Parameter Number (decimal) |
| Scattered_Read_Request[10] | 0     | INT       | Pad Word                   |
| Scattered_Read_Request[11] | 0     | INT       | Pad Word                   |
| Scattered_Read_Request[12] | 260   | INT       | Parameter Number (decimal) |
| Scattered_Read_Request[13] | 0     | INT       | Pad Word                   |
| Scattered_Read_Request[14] | 0     | INT       | Pad Word                   |

### ControlLogix Example Scattered Read Response Data

The Scattered Read Request message reads the multiple parameters and returns their values to the destination tag (Scattered\_Read\_Response). [Figure 6.10](#) or [Figure 6.11](#) shows the parameter values.

**Figure 6.10 Example Scattered Read Response Data for PowerFlex 7-Class Drive**

| Name                        | Value | Data Type | Description                |
|-----------------------------|-------|-----------|----------------------------|
| Scattered_Read_Response     | {...} | INT[15]   |                            |
| Scattered_Read_Response[0]  | 1     | INT       | Parameter Number (decimal) |
| Scattered_Read_Response[1]  | 325   | INT       | Parameter Value LSW        |
| Scattered_Read_Response[2]  | 0     | INT       | Parameter Value MSW        |
| Scattered_Read_Response[3]  | 3     | INT       | Parameter Number (decimal) |
| Scattered_Read_Response[4]  | 1     | INT       | Parameter Value LSW        |
| Scattered_Read_Response[5]  | 0     | INT       | Parameter Value MSW        |
| Scattered_Read_Response[6]  | 6     | INT       | Parameter Number (decimal) |
| Scattered_Read_Response[7]  | 1187  | INT       | Parameter Value LSW        |
| Scattered_Read_Response[8]  | 0     | INT       | Parameter Value MSW        |
| Scattered_Read_Response[9]  | 12    | INT       | Parameter Number (decimal) |
| Scattered_Read_Response[10] | 3292  | INT       | Parameter Value LSW        |
| Scattered_Read_Response[11] | 0     | INT       | Parameter Value MSW        |
| Scattered_Read_Response[12] | 17    | INT       | Parameter Number (decimal) |
| Scattered_Read_Response[13] | 8318  | INT       | Parameter Value LSW        |
| Scattered_Read_Response[14] | 0     | INT       | Parameter Value MSW        |

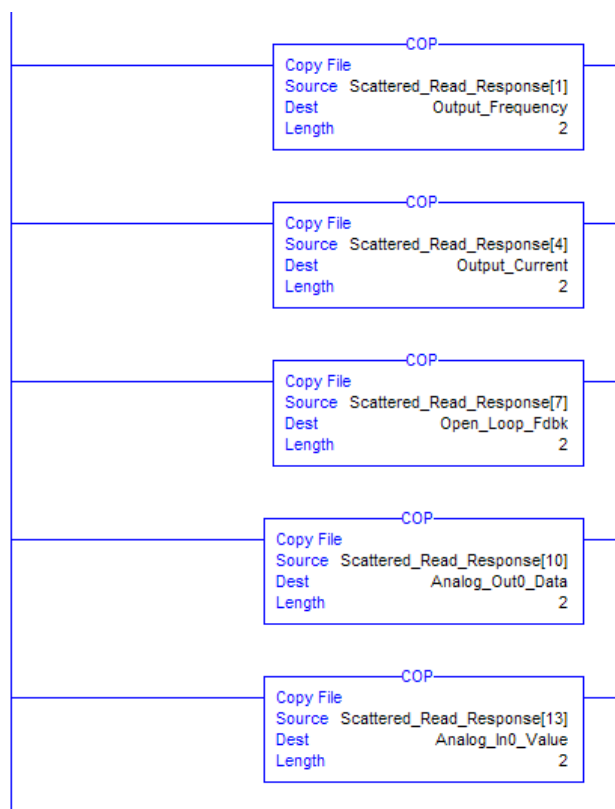
In this message example, the parameters have the following values:

| PowerFlex 7-Class Drive Parameter | Read Value |
|-----------------------------------|------------|
| 1 - [Output Freq]                 | 32.5 Hz    |
| 3 - [Output Current]              | 0.01 Amp   |
| 6 - [Output Voltage]              | 118.7 VAC  |
| 12 - [DC Bus Voltage]             | 329.2 VDC  |
| 17 - [Analog In2 Value]           | 8.318 mA   |

**Figure 6.11 Example Scattered Read Response Data for PowerFlex 750-Series Drive**

| Name                        | Value  | Data Type | Description                |
|-----------------------------|--------|-----------|----------------------------|
| Scattered_Read_Response     | {...}  | INT[15]   |                            |
| Scattered_Read_Response[0]  | 1      | INT       | Parameter Number (decimal) |
| Scattered_Read_Response[1]  | 0      | INT       | Parameter Value LSW        |
| Scattered_Read_Response[2]  | 16948  | INT       | Parameter Value MSW        |
| Scattered_Read_Response[3]  | 7      | INT       | Parameter Number (decimal) |
| Scattered_Read_Response[4]  | -15729 | INT       | Parameter Value LSW        |
| Scattered_Read_Response[5]  | 15605  | INT       | Parameter Value MSW        |
| Scattered_Read_Response[6]  | 137    | INT       | Parameter Number (decimal) |
| Scattered_Read_Response[7]  | 23698  | INT       | Parameter Value LSW        |
| Scattered_Read_Response[8]  | 26035  | INT       | Parameter Value MSW        |
| Scattered_Read_Response[9]  | 21581  | INT       | Parameter Number (decimal) |
| Scattered_Read_Response[10] | 0      | INT       | Parameter Value LSW        |
| Scattered_Read_Response[11] | 16948  | INT       | Parameter Value MSW        |
| Scattered_Read_Response[12] | 260    | INT       | Parameter Number (decimal) |
| Scattered_Read_Response[13] | -9437  | INT       | Parameter Value LSW        |
| Scattered_Read_Response[14] | 16661  | INT       | Parameter Value MSW        |

The PowerFlex 750-Series drive uses 32-bit integer and REAL parameters. A COP command must be used to copy the Scattered\_Read\_Response integer array to a 32-bit integer or REAL tag. [Figure 6.12](#) shows the ladder logic used for this example. If the parameter data type is a REAL, then the destination tag is a REAL. If the parameter data type is a 32-bit integer, then the destination tag is a DINT. See the drive documentation to determine the parameter data type (32-bit integer or REAL).

**Figure 6.12 Example Ladder Logic to Copy Response Data for PowerFlex 750-Series Drive**

In this message example, the parameters have the following values:

| PowerFlex 750-Series Drive Parameter | Read Value  | Data Type |
|--------------------------------------|-------------|-----------|
| 1 - [Output Freq]                    | 45.0 Hz     | REAL      |
| 7 - [Output Current]                 | 0.03 Amp    | REAL      |
| 137 - [Open Loop Fdbk]               | 1706253458  | DINT      |
| 21581 - [Port 5: Analog Out 0 Data]  | 45.0 Hz     | REAL      |
| 260 - [Analog In0 Value]             | 9.366 Volts | REAL      |

### ControlLogix Example Ladder Logic Program to Write Multiple Parameters (all versions)

A Scattered Write message is used to write to multiple parameters. This write message example writes the following values to these five parameters:

| PowerFlex 7-Class Drive Parameter | Write Value | PowerFlex 750-Series Drive Parameter | Write Value |
|-----------------------------------|-------------|--------------------------------------|-------------|
| 141 - [Accel Time 2]              | 11.1 Sec.   | 536 - [Accel Time 2]                 | 11.1 Sec.   |
| 143 - [Decel Time 2]              | 22.2 Sec.   | 538 - [Decel Time 2]                 | 22.2 Sec.   |
| 105 - [Preset Speed 5]            | 33.3 Hz.    | 725 - [Zero Position]                | 33          |
| 106 - [Preset Speed 6]            | 44.4 Hz.    | 21555 - [Port 5: Analog In0 Hi]      | 5.5         |
| 107 - [Preset Speed 7]            | 55.5 Hz.    | 780 - [PTP Setpoint]                 | -75,555     |

Refer to [DPI Parameter Object on page C-16](#) (Class code 0x93) or [Host DPI Parameter Object on page C-30](#) (Class code 0x9F) for parameter numbering.

**Important:** See [Table 6.A on page 6-2](#) for limitations of PowerFlex 7-Class and PowerFlex 750-Series drives when using Class code 0x93 or Class code 0x9F for explicit messaging.

**Table 6.E Example Controller Tags to Write Multiple Parameters**

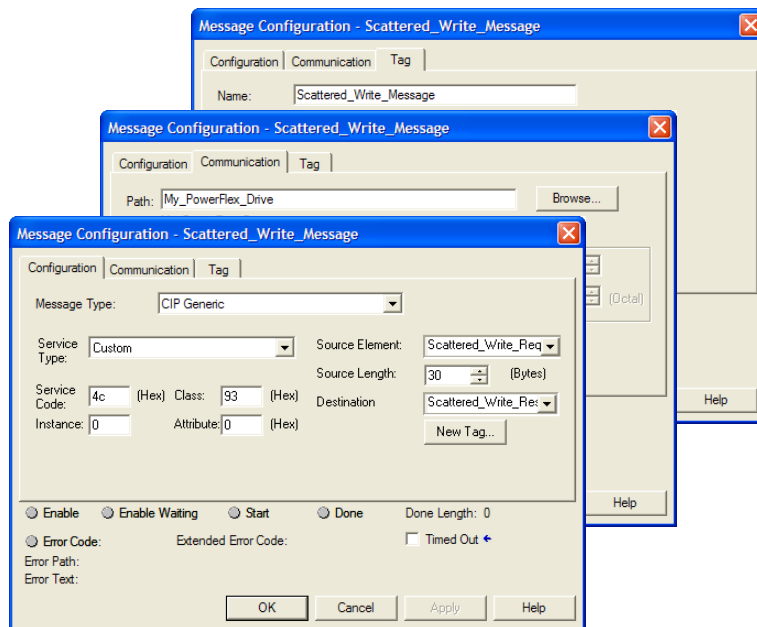
| Operand | Controller Tags for Write Multiple Message | Data Type |
|---------|--------------------------------------------|-----------|
| XIC     | Execute_Scattered_Write_Message            | BOOL      |
| MSG     | Scattered_Write_Message                    | MESSAGE   |

**Figure 6.13 Example Ladder Logic to Write Multiple Parameters**



**Important:** If the explicit message scattered write must be written continuously, then use a separate explicit message single write for each parameter using DPI Parameter Object Class code 0x93 or Host DPI Parameter Object Class code 0x9F and attribute A (10 decimal; see [page 6-22](#)). Attribute A writes to RAM—not NVS (EEPROM) memory. This example scattered write message using attribute 0 writes to NVS. Over time, continuous writes will exceed the EEPROM life cycle and cause the drive to malfunction.

## ControlLogix – Formatting a Message to Write Multiple Parameters (all versions)

**Figure 6.14 Scattered Write Multiple Message Configuration Screens**

The following table identifies the data that is required in each box to configure a message to write multiple parameters.

| Configuration Tab           | Example Value                          | Description                                                                                  |
|-----------------------------|----------------------------------------|----------------------------------------------------------------------------------------------|
| Message Type                | CIP Generic                            | Used to access Parameter Object in the adapter.                                              |
| Service Type <sup>(1)</sup> | Custom                                 | Required for scattered messages.                                                             |
| Service Code <sup>(1)</sup> | 4c (Hex.)                              | Code for the requested service.                                                              |
| Class                       | 93 or 9F (Hex.) <sup>(3)</sup>         | Class ID for the DPI Parameter Object.                                                       |
| Instance                    | 0 (Dec.)                               | Required for scattered messages.                                                             |
| Attribute                   | 0 (Hex.)                               | Required for scattered messages.                                                             |
| Source Element              | Scattered_Write_Request <sup>(4)</sup> | Name of the tag for any service data to be sent from scanner or bridge to the adapter/drive. |
| Source Length               | 30 <sup>(4)</sup>                      | Number of bytes of service data to be sent in the message.                                   |
| Destination                 | Scattered_Write_Response               | The tag where the data that is read is stored.                                               |
| Communication Tab           | Example Value                          | Description                                                                                  |
| Path <sup>(2)</sup>         | My_PowerFlex_Drive                     | The path is the route that the message will follow.                                          |
| Tag Tab                     | Example Value                          | Description                                                                                  |
| Name                        | Scattered_Write_Message                | The name for the message.                                                                    |

<sup>(1)</sup> The default setting for Service Type is "Custom," enabling entry of a Service Code not available from the Service Type pull-down menu. When choosing a Service Type other than "Custom" from the pull-down menu, an appropriate Hex. value is automatically assigned to the Service Code box which is dimmed (unavailable).

<sup>(2)</sup> Click **Browse** to find the path, or type in the name of the device listed in the I/O Configuration folder.

<sup>(3)</sup> See [Table 6.A on page 6-2](#) for limitations of PowerFlex 7-Class and PowerFlex 750-Series drives when using DPI Parameter Object Class code 0x93 or Host DPI Parameter Object Class code 0x9F for explicit messaging.

<sup>(4)</sup> In this example, we are writing to five parameters. Each parameter being written to requires an array of three INT registers. Therefore, a controller tag was created with its Data Type field set to "INT[15]." Also, the Source Length field on the Message Configuration screen must correspond to the selected Data Type in bytes (for this example, 30 bytes for an INT[15] array). Scattered write messages always assume that every parameter being written to is a 32-bit parameter, regardless of its actual size. Maximum length is 132 bytes or 66 words which equates to 22 parameters. For parameter numbering, see [DPI Parameter Object on page C-16](#) (Class code 0x93) or [Host DPI Parameter Object on page C-30](#) (Class code 0x9F).

### ControlLogix Example Scattered Write Request Data

In this message example, we use the data structure in [Figure 6.15](#) or [Figure 6.18](#) in the source tag (Scattered\_Write\_Request) to write new values to these parameters:

| PowerFlex 7-Class Drive Parameter | Write Value |
|-----------------------------------|-------------|
| 141 - [Accel Time 2]              | 11.1 Sec.   |
| 143 - [Decel Time 2]              | 22.2 Sec.   |
| 105 - [Preset Speed 5]            | 33.3 Hz.    |
| 106 - [Preset Speed 6]            | 44.4 Hz.    |
| 107 - [Preset Speed 7]            | 55.5 Hz.    |

| PowerFlex 750-Series Drive Parameter | Write Value | Data Type |
|--------------------------------------|-------------|-----------|
| 536 - [Accel Time 2]                 | 11.1 Sec.   | REAL      |
| 538 - [Decel Time 2]                 | 22.2 Sec.   | REAL      |
| 725 - [Zero Position]                | 33          | DINT      |
| 21555 - [Port 5: Analog In0 Hi]      | 5.5         | REAL      |
| 780 - [PTP Setpoint]                 | -75,555     | REAL      |

Refer to [DPI Parameter Object on page C-16](#) (Class code 0x93) or [Host DPI Parameter Object on page C-30](#) (Class code 0x9F) for parameter numbering.

[Figure 6.15](#) or [Figure 6.18](#) shows the parameter values.

**Figure 6.15 Example Scattered Write Request Data for PowerFlex 7-Class Drive**

| Name                          | Value | Data Type | Description                |
|-------------------------------|-------|-----------|----------------------------|
| Scattered_Write_Request       | {...} | INT[15]   |                            |
| + Scattered_Write_Request[0]  | 141   | INT       | Parameter Number (decimal) |
| + Scattered_Write_Request[1]  | 111   | INT       | Parameter Value LS'w       |
| + Scattered_Write_Request[2]  | 0     | INT       | Parameter Value MS'w       |
| + Scattered_Write_Request[3]  | 143   | INT       | Parameter Number (decimal) |
| + Scattered_Write_Request[4]  | 222   | INT       | Parameter Value LS'w       |
| + Scattered_Write_Request[5]  | 0     | INT       | Parameter Value MS'w       |
| + Scattered_Write_Request[6]  | 105   | INT       | Parameter Number (decimal) |
| + Scattered_Write_Request[7]  | 333   | INT       | Parameter Value LS'w       |
| + Scattered_Write_Request[8]  | 0     | INT       | Parameter Value MS'w       |
| + Scattered_Write_Request[9]  | 106   | INT       | Parameter Number (decimal) |
| + Scattered_Write_Request[10] | 444   | INT       | Parameter Value LS'w       |
| + Scattered_Write_Request[11] | 0     | INT       | Parameter Value MS'w       |
| + Scattered_Write_Request[12] | 107   | INT       | Parameter Number (decimal) |
| + Scattered_Write_Request[13] | 555   | INT       | Parameter Value LS'w       |
| + Scattered_Write_Request[14] | 0     | INT       | Parameter Value MS'w       |

### ControlLogix Example Scattered Write Response Data

The results of the message appear in the destination tag named Scattered\_Write\_Response ([Figure 6.16](#)). Values of “0” indicate no errors occurred.

**Figure 6.16 Example Scattered Write Response Data for PowerFlex 7-Class Drive**

| Name                         | Value   | Data Type | Description                |
|------------------------------|---------|-----------|----------------------------|
| Scattered_Write_Response     | { ... } | INT[15]   |                            |
| Scattered_Write_Response[0]  | 141     | INT       | Parameter Number (decimal) |
| Scattered_Write_Response[1]  | 0       | INT       | Pad Word or Error Code     |
| Scattered_Write_Response[2]  | 0       | INT       | Pad Word                   |
| Scattered_Write_Response[3]  | 143     | INT       | Parameter Number (decimal) |
| Scattered_Write_Response[4]  | 0       | INT       | Pad Word or Error Code     |
| Scattered_Write_Response[5]  | 0       | INT       | Pad Word                   |
| Scattered_Write_Response[6]  | 105     | INT       | Parameter Number (decimal) |
| Scattered_Write_Response[7]  | 0       | INT       | Pad Word or Error Code     |
| Scattered_Write_Response[8]  | 0       | INT       | Pad Word                   |
| Scattered_Write_Response[9]  | 106     | INT       | Parameter Number (decimal) |
| Scattered_Write_Response[10] | 0       | INT       | Pad Word or Error Code     |
| Scattered_Write_Response[11] | 0       | INT       | Pad Word                   |
| Scattered_Write_Response[12] | 107     | INT       | Parameter Number (decimal) |
| Scattered_Write_Response[13] | 0       | INT       | Pad Word or Error Code     |
| Scattered_Write_Response[14] | 0       | INT       | Pad Word                   |

The PowerFlex 750-Series drive uses 32-bit integer and REAL parameters. A COP command must be used to copy the 32-bit integer and REAL values to the Scattered\_Write\_Request integer array. [Figure 6.17](#) shows the ladder logic used for this example. If the parameter data type is a REAL, then the source tag is a REAL. If the parameter data type is a 32-bit integer, then the source tag is a DINT. See the drive documentation to determine the parameter data type (32-bit integer or REAL).

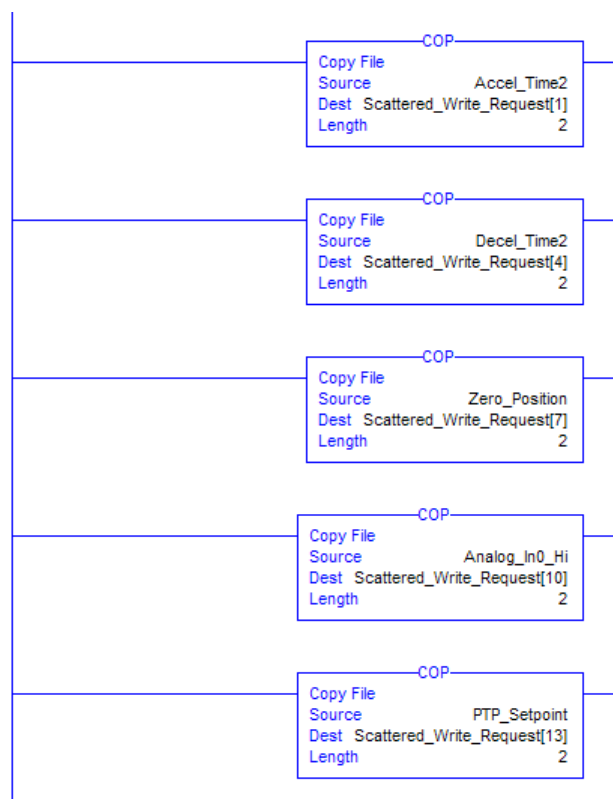
**Figure 6.17 Example Ladder Logic to Copy Request Data for PowerFlex 750-Series Drive**

**Figure 6.18 Example Scattered Write Request Data for PowerFlex 750-Series Drive**

| Name                        | Value   | Data Type | Description                |
|-----------------------------|---------|-----------|----------------------------|
| Scattered_Write_Request     | { ... } | INT[15]   |                            |
| Scattered_Write_Request[0]  | 536     | INT       | Parameter Number (decimal) |
| Scattered_Write_Request[1]  | -26214  | INT       | Parameter Value LSW        |
| Scattered_Write_Request[2]  | 16689   | INT       | Parameter Value MSW        |
| Scattered_Write_Request[3]  | 538     | INT       | Parameter Number (decimal) |
| Scattered_Write_Request[4]  | -26214  | INT       | Parameter Value LSW        |
| Scattered_Write_Request[5]  | 16817   | INT       | Parameter Value MSW        |
| Scattered_Write_Request[6]  | 725     | INT       | Parameter Number (decimal) |
| Scattered_Write_Request[7]  | 33      | INT       | Parameter Value LSW        |
| Scattered_Write_Request[8]  | 0       | INT       | Parameter Value MSW        |
| Scattered_Write_Request[9]  | 21555   | INT       | Parameter Number (decimal) |
| Scattered_Write_Request[10] | 0       | INT       | Parameter Value LSW        |
| Scattered_Write_Request[11] | 16560   | INT       | Parameter Value MSW        |
| Scattered_Write_Request[12] | 780     | INT       | Parameter Number (decimal) |
| Scattered_Write_Request[13] | -10019  | INT       | Parameter Value LSW        |
| Scattered_Write_Request[14] | -2      | INT       | Parameter Value MSW        |

The results of the explicit message appear in the destination tag Scattered\_Write\_Response (Figure 6.19). Values of “0” indicate no errors occurred.

**Figure 6.19 Example Scattered Write Response Data for PowerFlex 750-Series Drive**

| Name                         | Value   | Data Type | Description                |
|------------------------------|---------|-----------|----------------------------|
| Scattered_Write_Response     | { ... } | INT[15]   |                            |
| Scattered_Write_Response[0]  | 536     | INT       | Parameter Number (decimal) |
| Scattered_Write_Response[1]  | 0       | INT       | Pad Word or Error Code     |
| Scattered_Write_Response[2]  | 0       | INT       | Pad Word                   |
| Scattered_Write_Response[3]  | 538     | INT       | Parameter Number (decimal) |
| Scattered_Write_Response[4]  | 0       | INT       | Pad Word or Error Code     |
| Scattered_Write_Response[5]  | 0       | INT       | Pad Word                   |
| Scattered_Write_Response[6]  | 725     | INT       | Parameter Number (decimal) |
| Scattered_Write_Response[7]  | 0       | INT       | Pad Word or Error Code     |
| Scattered_Write_Response[8]  | 0       | INT       | Pad Word                   |
| Scattered_Write_Response[9]  | 21555   | INT       | Parameter Number (decimal) |
| Scattered_Write_Response[10] | 0       | INT       | Pad Word or Error Code     |
| Scattered_Write_Response[11] | 0       | INT       | Pad Word                   |
| Scattered_Write_Response[12] | 780     | INT       | Parameter Number (decimal) |
| Scattered_Write_Response[13] | 0       | INT       | Pad Word or Error Code     |
| Scattered_Write_Response[14] | 0       | INT       | Pad Word                   |

### ControlLogix – Explanation of Request and Response Data for Read/Write Multiple Messaging (all versions)

The data structures in [Figure 6.20](#) and [Figure 6.21](#) use 16-bit words and can accommodate up to 22 parameters in a single message. In the Response Message, a parameter number with the high bit set indicates that the associated parameter value field contains an error code (parameter number in response data will be negative).

**Important:** See [Table 6.A on page 6-2](#) for limitations of PowerFlex 7-Class and PowerFlex 750-Series drives when using Class code 0x93 or Class code 0x9F for explicit messaging.

**Figure 6.20 Data Structures for Scattered Read Messages**

| Request (Source Data) |                  | Response (Destination Data) |                     |
|-----------------------|------------------|-----------------------------|---------------------|
| Word 0                | Parameter Number | Word 0                      | Parameter Number    |
| 1                     | Pad Word         | 1                           | Parameter Value LSW |
| 2                     | Pad Word         | 2                           | Parameter Value MSW |
| 3                     | Parameter Number | 3                           | Parameter Number    |
| 4                     | Pad Word         | 4                           | Parameter Value LSW |
| 5                     | Pad Word         | 5                           | Parameter Value MSW |
| 6                     | Parameter Number | 6                           | Parameter Number    |
| 7                     | Pad Word         | 7                           | Parameter Value LSW |
| 8                     | Pad Word         | 8                           | Parameter Value MSW |
| 9                     | Parameter Number | 9                           | Parameter Number    |
| 10                    | Pad Word         | 10                          | Parameter Value LSW |
| 11                    | Pad Word         | 11                          | Parameter Value MSW |
| 12                    | Parameter Number | 12                          | Parameter Number    |
| 13                    | Pad Word         | 13                          | Parameter Value LSW |
| 14                    | Pad Word         | 14                          | Parameter Value MSW |
| :                     |                  | :                           |                     |
| 63                    | Parameter Number | 63                          | Parameter Number    |
| 64                    | Pad Word         | 64                          | Parameter Value LSW |
| 65                    | Pad Word         | 65                          | Parameter Value MSW |

**Figure 6.21 Data Structures for Scattered Write Messages**

| Request (Source Data) |                     | Response (Destination Data) |                  |
|-----------------------|---------------------|-----------------------------|------------------|
| Word 0                | Parameter Number    | Word 0                      | Parameter Number |
| 1                     | Parameter Value LSW | 1                           | Pad Word         |
| 2                     | Parameter Value MSW | 2                           | Pad Word         |
| 3                     | Parameter Number    | 3                           | Parameter Number |
| 4                     | Parameter Value LSW | 4                           | Pad Word         |
| 5                     | Parameter Value MSW | 5                           | Pad Word         |
| 6                     | Parameter Number    | 6                           | Parameter Number |
| 7                     | Parameter Value LSW | 7                           | Pad Word         |
| 8                     | Parameter Value MSW | 8                           | Pad Word         |
| 9                     | Parameter Number    | 9                           | Parameter Number |
| 10                    | Parameter Value LSW | 10                          | Pad Word         |
| 11                    | Parameter Value MSW | 11                          | Pad Word         |
| 12                    | Parameter Number    | 12                          | Parameter Number |
| 13                    | Parameter Value LSW | 13                          | Pad Word         |
| 14                    | Parameter Value MSW | 14                          | Pad Word         |
| :                     |                     | :                           |                  |
| 63                    | Parameter Number    | 63                          | Parameter Number |
| 64                    | Parameter Value LSW | 64                          | Pad Word         |
| 65                    | Parameter Value MSW | 65                          | Pad Word         |

## Explicit Messaging Using RSLogix 5000 (all versions)

### ControlLogix Example Ladder Logic Program to Read a Single Parameter

A Get Attribute Single message is used to read a single parameter. This read message example reads the value of parameter 003 - [Output Current] in a PowerFlex 7-Class drive.

**Important:** See [Table 6.A on page 6-2](#) for limitations of PowerFlex 7-Class and PowerFlex 750-Series drives when using DPI Parameter Object Class code 0x93 or Host DPI Parameter Object Class code 0x9F for explicit messaging.

**Table 6.F Example Controller Tags to Read a Single Parameter**

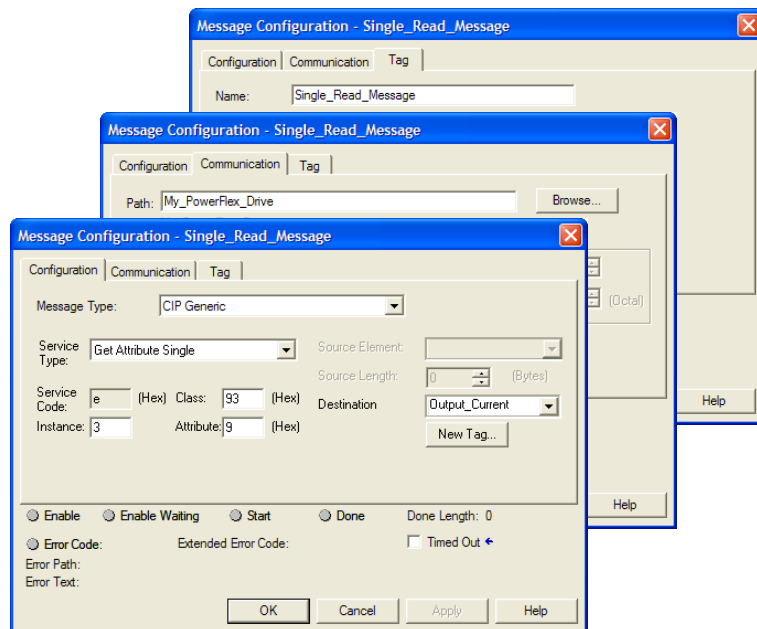
| Operand | Controller Tags for Single Read Message | Data Type |
|---------|-----------------------------------------|-----------|
| XIC     | Execute_Single_Read_Message             | BOOL      |
| MSG     | Single_Read_Message                     | MESSAGE   |

**Figure 6.22 Example Ladder Logic to Read a Single Parameter**



## ControlLogix – Formatting a Message to Read a Single Parameter (all versions)

Figure 6.23 Get Attribute Single Message Configuration Screens



The following table identifies the data that is required in each box to configure a message to read a single parameter.

| Configuration Tab           | Example Value                  | Description                                         |
|-----------------------------|--------------------------------|-----------------------------------------------------|
| Message Type                | CIP Generic                    | Used to access the Parameter Object in the adapter. |
| Service Type <sup>(1)</sup> | Get Attribute Single           | This service is used to read a parameter value.     |
| Service Code <sup>(1)</sup> | e (Hex.)                       | Code for the requested service.                     |
| Class                       | 93 or 9F (Hex.) <sup>(4)</sup> | Class ID for the DPI Parameter Object.              |
| Instance <sup>(2)</sup>     | 3 (Dec.)                       | Instance number is the same as parameter number.    |
| Attribute                   | 9 (Hex.)                       | Attribute number for the Parameter Value attribute. |
| Destination                 | Output_Current <sup>(5)</sup>  | The tag where the data that is read is stored.      |
| Communication Tab           | Example Value                  | Description                                         |
| Path <sup>(3)</sup>         | My_PowerFlex_Drive             | The path is the route that the message will follow. |
| Tag Tab                     | Example Value                  | Description                                         |
| Name                        | Single_Read_Message            | The name for the message.                           |

<sup>(1)</sup> The default setting for Service Type is “Custom,” enabling entry of a Service Code not available from the Service Type pull-down menu. When choosing a Service Type other than “Custom” from the pull-down menu, an appropriate Hex. value is automatically assigned to the Service Code box which is dimmed (unavailable).

<sup>(2)</sup> The instance is the parameter number in the drive (Port 0). For example, to read parameter 4 of a peripheral in Port 5 of a PowerFlex 750-Series drive, the instance would be  $21504 + 4 = 21508$ . See [DPI Parameter Object on page C-16](#) (Class code 0x93) or [Host DPI Parameter Object on page C-30](#) (Class code 0x9F) to determine the instance number.

<sup>(3)</sup> Click **Browse** to find the path, or type in the name of the device listed in the I/O Configuration folder.

<sup>(4)</sup> See [Table 6.A on page 6-2](#) for limitations of PowerFlex 7-Class and PowerFlex 750-Series drives when using DPI Parameter Object Class code 0x93 or Host DPI Parameter Object Class code 0x9F for explicit messaging.

<sup>(5)</sup> In this example, Output Current is a 32-bit parameter requiring the Data Type field to be set to “DINT” when creating the controller tag. If the parameter being read is a 16-bit parameter, the tag Data Type field must be set to “INT.” When using a PowerFlex 700S or PowerFlex 750-Series drive, Output Current is a floating point number requiring the Data Type field to be set to “REAL” when the creating controller tag. See the drive documentation to determine the size of the parameter and its data type (16-bit or 32-bit integer or REAL).

### ControlLogix Example Ladder Logic Program to Write a Single Parameter (all versions)

A Set Attribute Single message is used to write to a single parameter. This write message example writes a value to parameter 140 - [Accel Time 1] in a PowerFlex 7-Class drive.

**Table 6.G Example Controller Tags to Write a Single Parameter**

| Operand | Controller Tags for Single Write Message | Data Type |
|---------|------------------------------------------|-----------|
| XIC     | Execute_Single_Write_Message             | BOOL      |
| MSG     | Single_Write_Message                     | MESSAGE   |

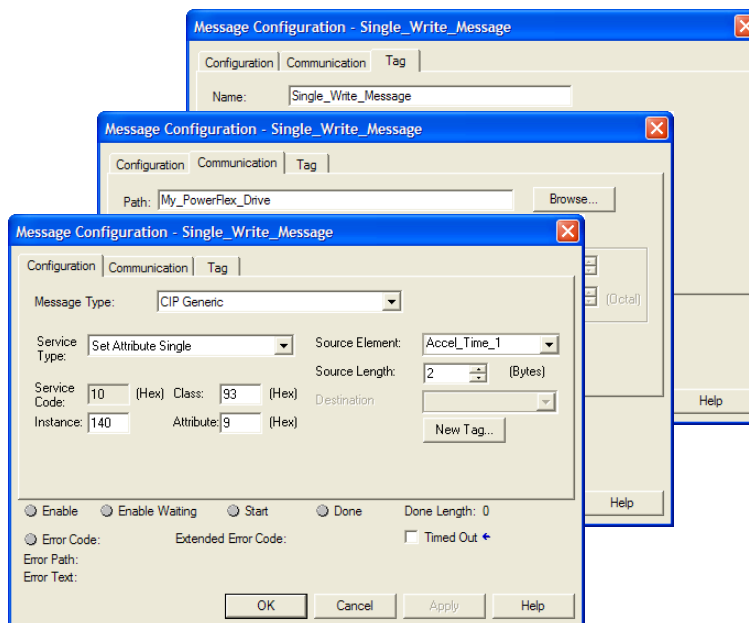
**Important:** See [Table 6.A on page 6-2](#) for limitations of PowerFlex 7-Class and PowerFlex 750-Series drives when using DPI Parameter Object Class code 0x93 or Host DPI Parameter Object 0x9F for explicit messaging.

**Figure 6.24 Example Ladder Logic to Write a Single Parameter**



## ControlLogix – Formatting a Message to Write a Single Parameter (all versions)

Figure 6.25 Set Attribute Single Message Configuration Screens



The following table identifies the data that is required in each box to configure a message to write a single parameter.

| Configuration Tab           | Example Value                  | Description                                                                                      |
|-----------------------------|--------------------------------|--------------------------------------------------------------------------------------------------|
| Message Type                | CIP Generic                    | Used to access the Parameter Object in the adapter.                                              |
| Service Type <sup>(1)</sup> | Set Attribute Single           | This service is used to write a parameter value.                                                 |
| Service Code <sup>(1)</sup> | 10 (Hex.)                      | Code for the requested service.                                                                  |
| Class                       | 93 or 9F (Hex.) <sup>(5)</sup> | Class ID for the DPI Parameter Object.                                                           |
| Instance <sup>(2)</sup>     | 140 (Dec.)                     | Instance number is the same as parameter number.                                                 |
| Attribute <sup>(3)</sup>    | 9 or A (Hex.)                  | Attribute number for the Parameter Value attribute.                                              |
| Source Element              | Accel_Time_1 <sup>(6)</sup>    | Name of the tag for any service data to be sent from the scanner or bridge to the adapter/drive. |
| Source Length               | 2 <sup>(6)</sup>               | Number of bytes of service data to be sent in the message.                                       |
| Communication Tab           | Example Value                  | Description                                                                                      |
| Path <sup>(4)</sup>         | My_PowerFlex_Drive             | The path is the route that the message will follow.                                              |
| Tag Tab                     | Example Value                  | Description                                                                                      |
| Name                        | Single_Write_Message           | The name for the message.                                                                        |

- <sup>(1)</sup> The default setting for Service Type is "Custom," enabling entry of a Service Code not available from the Service Type pull-down menu. When choosing a Service Type other than "Custom" from the pull-down menu, an appropriate Hex. value is automatically assigned to the Service Code box which is dimmed (unavailable).
- <sup>(2)</sup> The instance is the parameter number in the drive (Port 0). For example, to write to parameter 4 of a peripheral in Port 5 of a PowerFlex 750-Series drive, the instance would be  $21504 + 4 = 21508$ . See [DPI Parameter Object on page C-16](#) (Class code 0x93) or [Host DPI Parameter Object on page C-30](#) (Class code 0x9F) to determine the instance number.
- <sup>(3)</sup> Setting the Attribute value to "9" will write the parameter value to the drive's Non-Volatile Storage (EEPROM) memory, so the parameter value will remain even after the drive is power cycled. **Important:** When set to "9," be very cautious as the EEPROM may quickly exceed its life cycle and cause the drive to malfunction. Setting the Attribute value to "A" (10 decimal) will write the parameter value to temporary memory, so the parameter value will be lost after the drive is power cycled. It is recommended to use the "A" (10 decimal) setting when frequent write messages are required.
- <sup>(4)</sup> Click **Browse** to find the path, or type in the name of the device listed in the I/O Configuration folder.
- <sup>(5)</sup> See [Table 6.A on page 6-2](#) for limitations of PowerFlex 7-Class and PowerFlex 750-Series drives when using DPI Parameter Object Class code 0x93 or Host DPI Parameter Object Class code 0x9F for explicit messaging.
- <sup>(6)</sup> In this example, Accel Time 1 is a 16-bit parameter requiring the tag Data Type field to be set to "INT" when creating the controller tag. If the parameter being written to is a 32-bit parameter, the tag Data Type field must be set to "DINT." Also, the Source Length field on the Message Configuration screen must correspond to the selected Data Type in bytes (for example, 4 bytes for a DINT or a REAL). When using a PowerFlex 700S or PowerFlex 750-Series drive, Accel Time 1 is a floating point number requiring the Data Type field to be set to "REAL" when creating the controller tag. See the drive documentation to determine the size of the parameter and its data type (16-bit or 32-bit integer or REAL).

### ControlLogix Example Ladder Logic Program to Read or Write Multiple Parameters (all versions)

Since the example ladder logic rungs, configuration screens, and request/response data to read or write multiple parameters using RSLogix 5000 (all versions) are identical to those for RSLogix 5000 version 15 (or later), please refer to the information contained on [page 6-8](#) through [page 6-18](#) for complete details.

## PLC-5 Examples

**Important:** The PLC-5 must be Series E (Rev. D.1 or later) to support the MultiHop feature that routes messaging to the drive.

**Important:** Due to inherent limitations with the PCCC N-File method, only contiguous multiple parameters can be read or written using explicit messaging.

For this explicit message example, we use the N150 N-Files because they are already mapped to specific parameters in the drive and its connected peripherals. This enables direct access to any parameter. The other available N40 N-File to use for explicit messaging requires considerably more configuration to achieve the same result. Every read or write message using the N40 N-Files requires configuring a request message, inputting data into the request data table, configuring a response message, and inputting data into the response data table. However, if accessing items other than parameters (for example, drive faults or events), the N40 N-Files must be used since only parameters can be accessed using the N150 N-Files.

**Important:** When performing a write parameter message, the data will always be written to the drive's Non-Volatile Storage (NVS). Over time, continuous writes will exceed the EEPROM life cycle and cause the drive to malfunction.

For PCCC N150 N-File information, refer to [page C-11](#).

### PLC-5 Example Ladder Logic Program to Read a Single Parameter

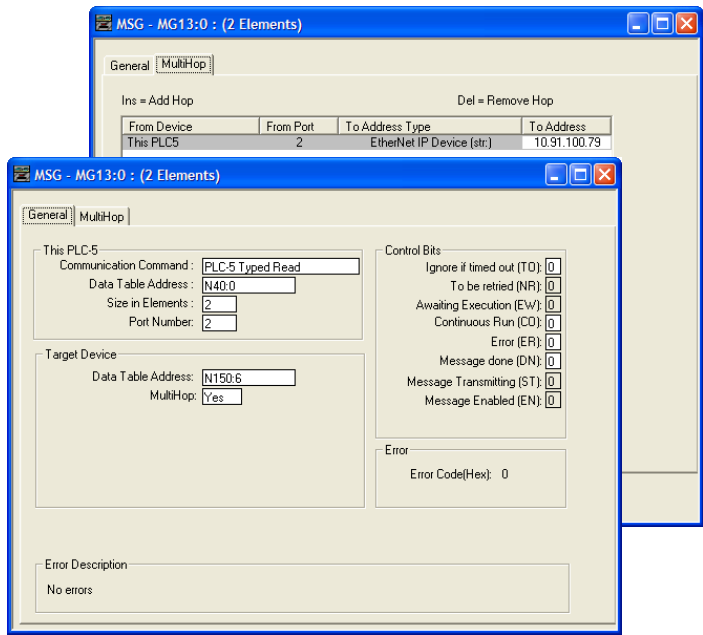
A read message is used to read a single parameter. The specific N150:6 address shown in this read message example reads the value of parameter 003 - [Output Current] in a PowerFlex 7-Class drive. Footnote 2 under the [Figure 6.27](#) table shows other N-file addressing to read various integer and REAL (floating point) parameters in PowerFlex 7-Class and PowerFlex 750-Series drives.

**Figure 6.26 Example Ladder Logic to Read a Single Parameter**



PLC-5 – Formatting a Message to Read a Single Parameter

Figure 6.27 Read Single Message Configuration Screens



The following table identifies the data that is required in each box to configure a message to read a parameter.

| General Tab           | Example Value         | Description                                                                                                                            |
|-----------------------|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Communication Command | PLC-5 Typed Read      | Controller type and command type for controller to read data from the drive.                                                           |
| Data Table Address    | N40:0                 | An unused controller data table address containing the message instruction. This address is the starting word of the destination file. |
| Size in Elements      | 2 <sup>(1)</sup>      | Number of elements (words) to be transferred. Each element size is a 16-bit integer.                                                   |
| Port Number           | 2                     | Controller port to which the network is connected.                                                                                     |
| Data Table Address    | N150:6 <sup>(2)</sup> | Specific starting address of the source file in the drive.                                                                             |
| MultiHop              | Yes                   | Enables communication to allow network messaging to be routed to the drive.                                                            |
| MultiHop Tab          | Example Value         | Description                                                                                                                            |
| To Address            | 10.91.100.79          | IP address of the adapter connected to the drive.                                                                                      |

(1) Because the N-files used for the data transfer occupies two contiguous 16-bit words, the Size in Elements must always be set to 2 regardless of whether the parameter being read is a 16-bit parameter or a 32-bit parameter.

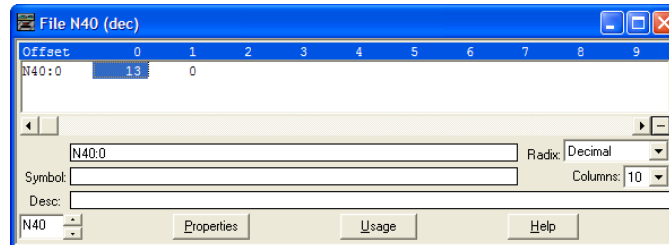
(2) See [page C-11](#) for N-file addressing. Below are some examples of how to address N-files:

| N-File Address | Data Type      | Description                                                             | Notes                                                                                                               |
|----------------|----------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| N150:6         | 32-bit integer | Parameter 3 of PowerFlex 70 drive                                       | Example ladder logic rungs are shown in <a href="#">Figure 6.29</a> for these three different parameter data types. |
| N155:14        | 32-bit REAL    | Parameter 7 of PowerFlex 750-Series drive                               |                                                                                                                     |
| N155:200       | 32-bit integer | Parameter 725 of PowerFlex 750-Series drive                             |                                                                                                                     |
| N209:154       | 32-bit REAL    | Port 5: Parameter 77 of 24V I/O module in PowerFlex 750-Series drive    |                                                                                                                     |
| N211:50        | 16-bit integer | Port 6: Parameter 25 of 20-COMM-E adapter in PowerFlex 750-Series drive |                                                                                                                     |

### PLC-5 Example Single Read Response Data

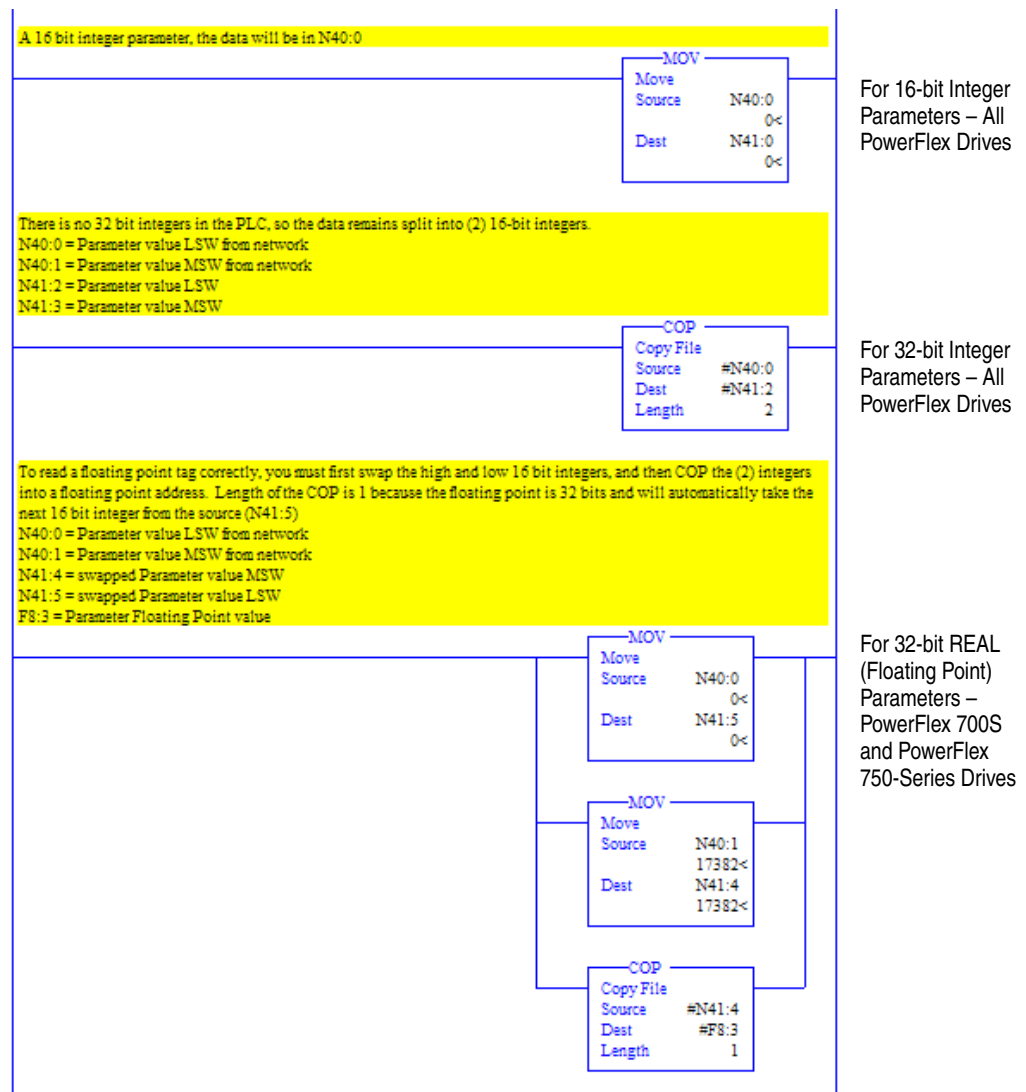
In this specific N150:6 message example, we use the data table address in [Figure 6.28](#) to store the response value (0.13 amps) that was read from drive parameter 003 - [Output Current]. To determine the data type for the parameter and its required scaling, refer to the specific drive documentation.

**Figure 6.28 Example Single Read Response Data File**



[Figure 6.29](#) shows example ladder logic to correctly format the three possible data types for read messages in the PLC-5.

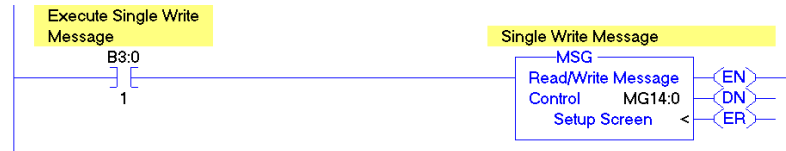
**Figure 6.29 Example Ladder Logic to Format Parameter Data Types for Reads**



### PLC-5 Example Ladder Logic Program to Write a Single Parameter

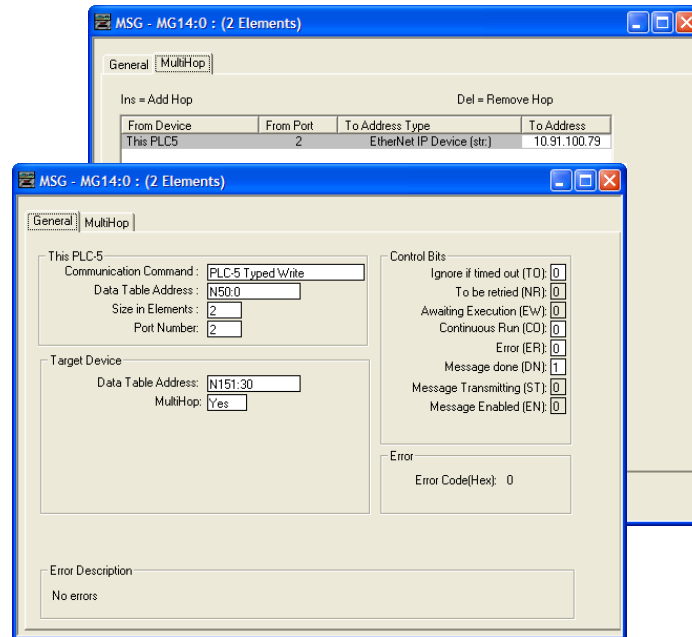
A write message is used to write to a single parameter. The specific N151:30 address shown in this write message example writes the value of parameter 140 - [Accel Time 1] in a PowerFlex 7-Class drive. Footnote 2 under the [Figure 6.31](#) table shows other N-file addressing to write various integer and REAL (floating point) parameters in PowerFlex 7-Class and PowerFlex 750-Series drives.

**Figure 6.30 Example Ladder Logic to Write a Single Parameter**



## PLC-5 – Formatting a Message to Write a Single Parameter

Figure 6.31 Write Single Message Configuration Screens



The following table identifies the data that is required in each box to configure a message to write a single parameter.

| General Tab           | Example Value          | Description                                                                                                                       |
|-----------------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| Communication Command | PLC-5 Typed Write      | Controller type and command type for controller to write data to the drive.                                                       |
| Data Table Address    | N50:0                  | An unused controller data table address containing the message instruction. This address is the starting word of the source file. |
| Size in Elements      | 2 <sup>(1)</sup>       | Number of elements (words) to be transferred. Each element size is a 16-bit integer.                                              |
| Port Number           | 2                      | Controller port to which the network is connected.                                                                                |
| Data Table Address    | N151:30 <sup>(2)</sup> | Specific starting address of the destination file in the drive.                                                                   |
| MultiHop              | Yes                    | Enables communication to allow network messaging to be routed to the drive.                                                       |
| MultiHop Tab          | Example Value          | Description                                                                                                                       |
| To Address            | 10.91.100.79           | IP address of the adapter connected to the drive.                                                                                 |

<sup>(1)</sup> In this example, Accel Time 1 is a 16-bit parameter. Because the N151 file used for the data transfer occupies two contiguous 16-bit words, the Size in Elements must always be set to 2 regardless of whether the parameter being written to is a 16-bit parameter or a 32-bit parameter.

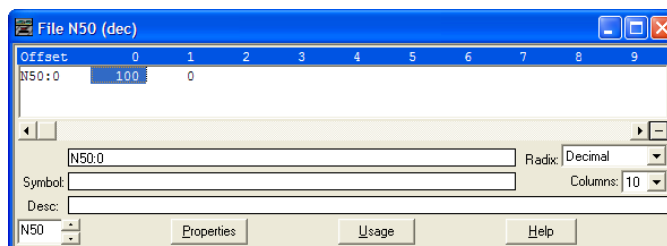
<sup>(2)</sup> See [page C-11](#) for N-file addressing. Below are some examples of how to address N-files:

| N-File Address | Data Type      | Description                                                          | Notes                                                                                                     |
|----------------|----------------|----------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| N151:30        | 16-bit integer | Parameter 140 of PowerFlex 70 drive                                  | Example ladder logic rungs are shown in <a href="#">Figure 6.33</a> for these three different data types. |
| N150:50        | 32-bit REAL    | Parameter 25 of PowerFlex 750-Series drive                           |                                                                                                           |
| N155:200       | 32-bit integer | Parameter 725 of PowerFlex 750-Series drive                          |                                                                                                           |
| N209:156       | 32-bit REAL    | Port 5: Parameter 78 of 24V I/O module in PowerFlex 750-Series drive |                                                                                                           |
| N201:14        | 16-bit integer | Port 1: Parameter 7 of 20-HIM-A6 HIM in PowerFlex 750-Series drive   |                                                                                                           |

### PLC-5 Example Single Write Response Data

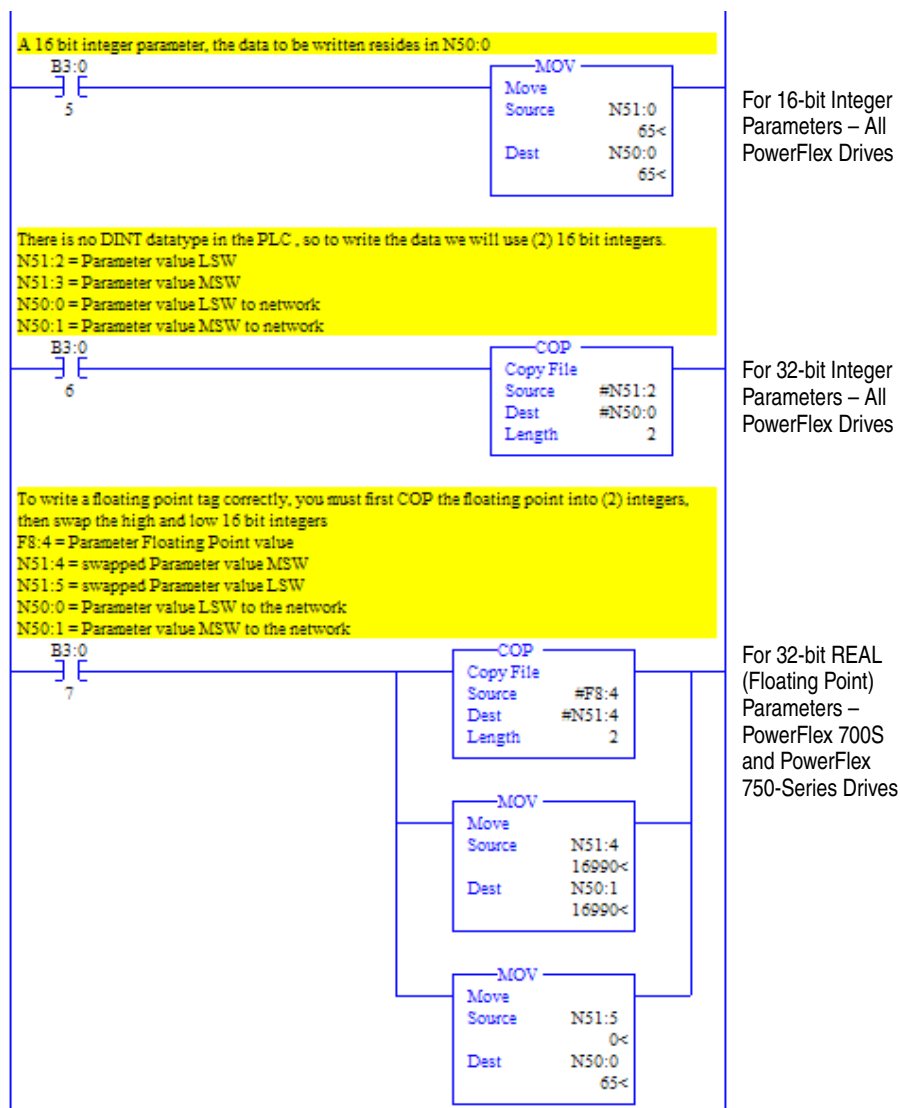
In this specific N151:30 message example, we use the data table address in [Figure 6.32](#) to store the request value (10.0 sec.) that was written to drive parameter 140 - [Accel Time 1]. To determine the data type for the parameter and its required scaling, refer to the specific drive documentation.

**Figure 6.32 Example Single Write Response Data File**



[Figure 6.33](#) shows example ladder logic to correctly format the three possible data types for write messages in the PLC-5.

**Figure 6.33 Example Ladder Logic to Format Parameter Data Types for Writes**



## PLC-5 Reading/Writing Multiple Parameters

You can read or write only contiguous parameters. Also, the range of contiguous parameters must be contained in the same N-File. Two elements (words) are required for each parameter being read or written. For example, to read 5 contiguous parameters, 10 elements (words) must be used.

### SLC 500 Examples

When using RSLogix 500 version 7.10 or earlier, explicit messaging must be performed using the PCCC N-File method. For RSLogix 500 version 7.20 or later, the CIP messaging method has been added along with the PCCC N-File method. However, it is recommended to use the CIP method because it is easier to use and understand. For this reason, only instructions for the CIP method are provided. If you must use the PCCC N-File method, refer to the [PLC-5 Examples on page 6-23](#).

The CIP messaging method provides two ways to perform explicit messaging:

- Read/Write Parameter Service simplifies setup by requiring less data to be entered in message configuration screens. However, the Read/Write Parameter Service can only be used to perform single parameter read or single parameter write explicit messages. (Multiple parameter reads or writes must be performed using the Generic Get/Set Attribute Service described below.)

**Important:** When performing a Write Parameter message, the data will always be written to the drive's Non-Volatile Storage (NVS). Continuous NVS writes may damage the drive's EEPROM. If continuous writes are necessary, use the Generic Set Attribute Single Service and attribute A (10 decimal; see [page 6-40](#)).

- Generic Get/Set Attribute Service requires more setup data to be entered in message configuration screens, but can be used to perform single parameter read or write and multiple parameter read or write explicit messages. Also, the Generic Set Attribute Service offers the choice of writing the data to the drive's Non-Volatile Storage (NVS) or the drive's Random Access Memory (RAM; for Generic Set Attribute Single service only, see [page 6-40](#)). Note that when selecting the data to be written to RAM, the data will be lost if the drive loses power.

For supported classes, instances, and attributes, refer to [Appendix C, EtherNet/IP Objects](#).

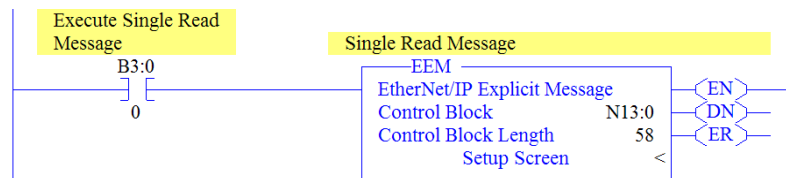
## SLC 500 Explicit Messaging Using the Read/Write Parameter Service

### SLC 500 Example Ladder Logic Program to Read a Single Parameter

A Read Parameter message is used to read a single parameter. This read message example reads the value of parameter 003 - [Output Current] in a PowerFlex 7-Class drive.

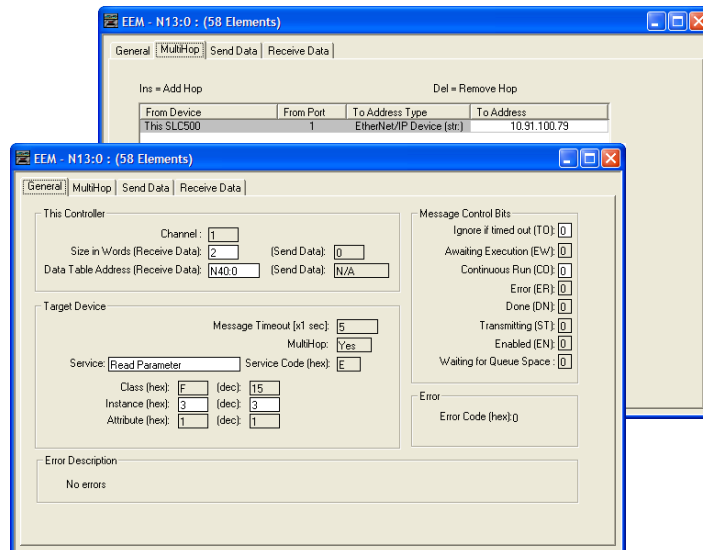
**Important:** Parameter Object Class code 0x0F is not supported in PowerFlex 750-Series drives. To do a single parameter read, follow the SLC 500 (Generic Attribute Service) single read example on [page 6-36](#).

**Figure 6.34 Example Ladder Logic to Read a Single Parameter**



## SLC 500 – Formatting a Message to Read a Single Parameter Using Read/Write Parameter Service

**Figure 6.35 Read Parameter Message Configuration Screens**



The following table identifies the data that is required in each box to configure a message to read a single parameter.

| General Tab             | Example Value    | Description                                                                                                                            |
|-------------------------|------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Size in Words           | 2 <sup>(3)</sup> | Number of words to be transferred. Each word size is a 16-bit integer.                                                                 |
| Data Table Address      | N40:0            | An unused controller data table address containing the message instruction. This address is the starting word of the destination file. |
| Service <sup>(1)</sup>  | Read Parameter   | Code for the requested service.                                                                                                        |
| Instance <sup>(2)</sup> | 3 (Dec.)         | Instance number is the same as the parameter number.                                                                                   |
| MultiHop Tab            | Example Value    | Description                                                                                                                            |
| To Address              | 10.91.100.79     | IP address of the adapter connected to the drive.                                                                                      |

<sup>(1)</sup> The default setting for Service is “Custom,” enabling entry of a Service Code not available from the Service pull-down menu. When choosing a Service other than “Custom” from the pull-down menu, an appropriate Hex. value is automatically assigned to the Service Code box which is dimmed (unavailable).

<sup>(2)</sup> Only drive parameters (Port 0) can be read using Parameter Object Class code 0x0F. To read a parameter of a peripheral in another port, use DPI Parameter Object Class code 0x93 (see [page 6-36](#)).

<sup>(3)</sup> In this example, Output Current is a 32-bit parameter. If the parameter being read is a 16-bit parameter, the Size in Words would be set to 1. When the parameter being read is a 32-bit REAL (floating point) data type, the size in words would be set to 2. See the drive documentation to determine the size of the parameter and its data type (16-bit or 32-bit integer or REAL).

SLC 500 Example Read Single Response Data

In this message example, we use the data table address in [Figure 6.36](#) to store the response value (0.13 amps) that was read from drive parameter 003 - [Output Current]. To determine the data type for the parameter and its required scaling, refer to the specific drive documentation.

Figure 6.36 Example Read Single Response Data File

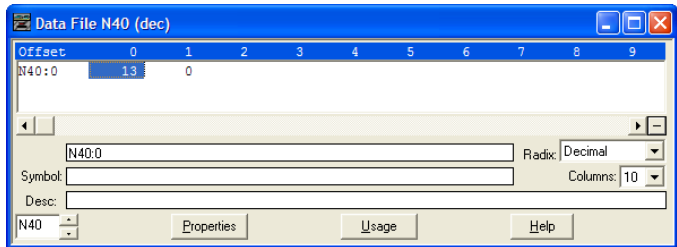
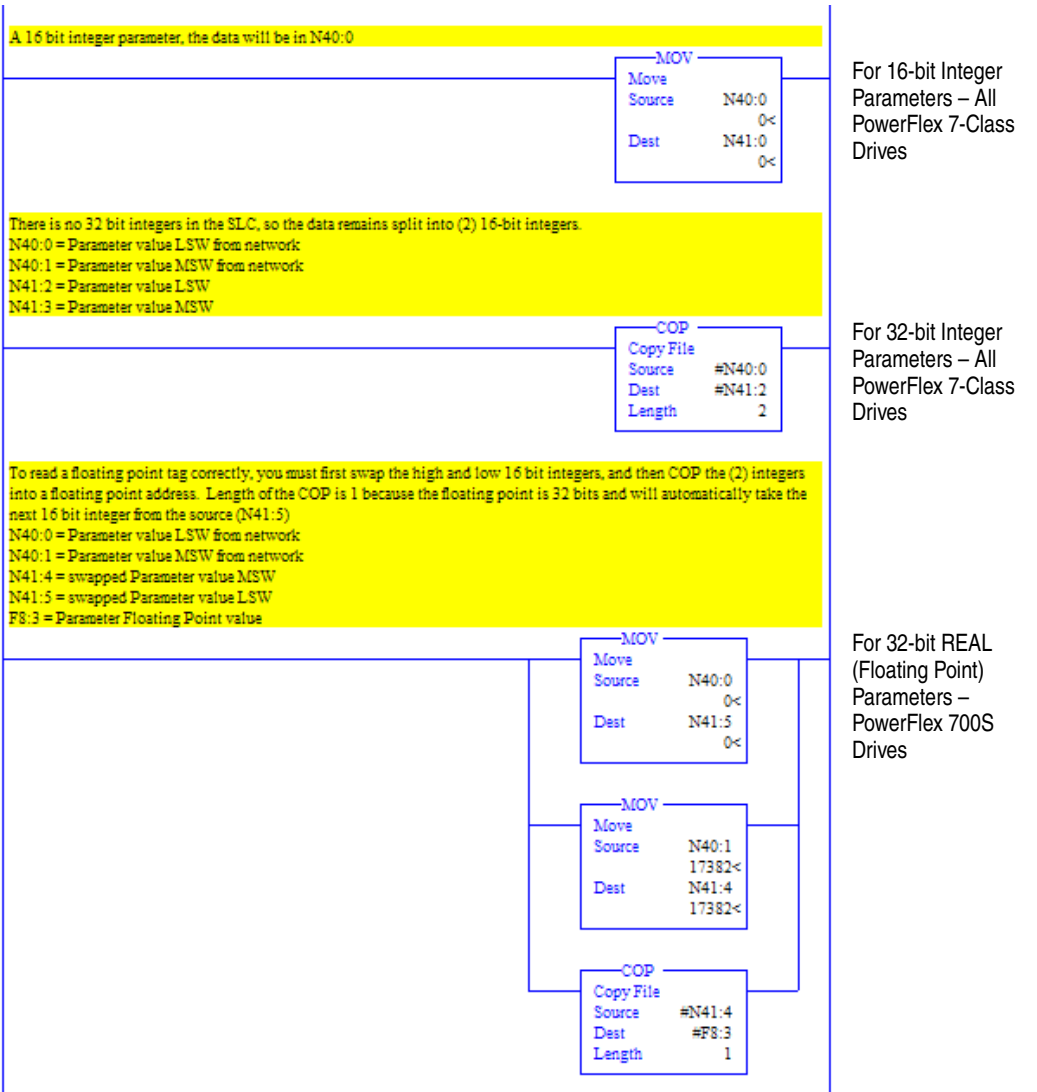


Figure 6.37 shows example ladder logic to correctly format the three possible data types for read messages in the SLC 500.

Figure 6.37 Example Ladder Logic to Format Parameter Data Types for Reads

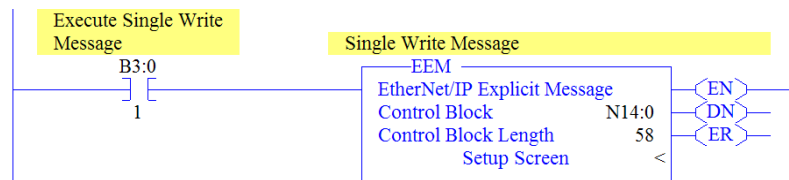


### SLC 500 Example Ladder Logic Program to Write a Single Parameter Using Read/Write Parameter Service

A Write Parameter message is used to write to a single parameter. This write message example writes a value to parameter 140 - [Accel Time 1] in a PowerFlex 7-Class drive.

**Important:** Parameter Object Class code 0x0F is not supported in PowerFlex 750-Series drives. To do a single parameter write, follow the SLC 500 (Generic Attribute Service) single write example on [page 6-39](#).

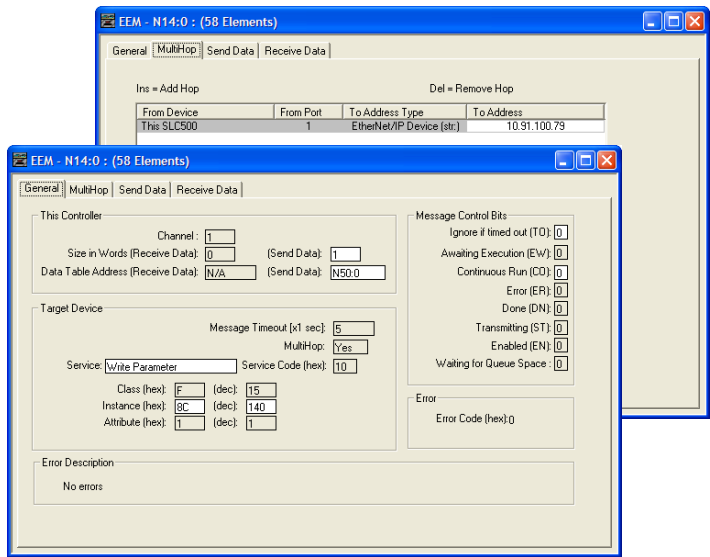
**Figure 6.38 Example Ladder Logic to Write a Single Parameter**



**Important:** If the explicit message single write must be written continuously, use DPI Parameter Object Class code 0x93 and attribute A (10 decimal; see [page 6-40](#)). This writes to RAM—not NVS (EEPROM) memory. This example single write message using Class code F writes to NVS. Over time, continuous writes will exceed the EEPROM life cycle and cause the drive to malfunction.

SLC 500 – Formatting a Message to Write a Single Parameter  
Using Read/Write Parameter Service

Figure 6.39 Write Parameter Message Configuration Screens



The following table identifies the data that is required in each box to configure a message to write a single parameter.

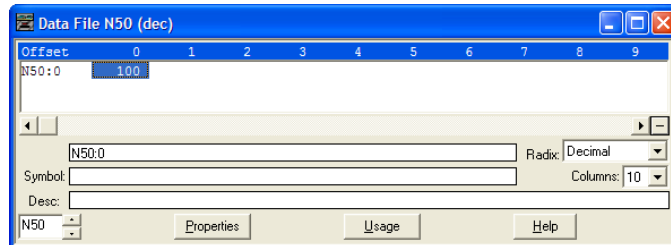
| General Tab             | Example Value    | Description                                                                                                                       |
|-------------------------|------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| Size in Words           | 1 <sup>(3)</sup> | Number of words to be transferred. Each word size is a 16-bit integer.                                                            |
| Data Table Address      | N50:0            | An unused controller data table address containing the message instruction. This address is the starting word of the source file. |
| Service <sup>(1)</sup>  | Write Parameter  | Code for the requested service.                                                                                                   |
| Instance <sup>(2)</sup> | 140 (Dec.)       | Instance number is the same as the parameter number.                                                                              |
| MultiHop Tab            | Example Value    | Description                                                                                                                       |
| To Address              | 10.91.100.79     | IP address of the adapter connected to the drive.                                                                                 |

- <sup>(1)</sup> The default setting for Service is “Custom,” enabling entry of a Service Code not available from the Service pull-down menu. When choosing a Service other than “Custom” from the pull-down menu, an appropriate Hex. value is automatically assigned to the Service Code box which is dimmed (unavailable).
- <sup>(2)</sup> Only drive parameters (Port 0) can be written to using Parameter Object Class code 0x0F. To write to a parameter of a peripheral in another port, use DPI Parameter Object Class code 0x93 (see [page 6-39](#)).
- <sup>(3)</sup> In this example, Accel Time 1 is a 16-bit parameter. If the parameter being written to is a 32-bit parameter, the Size in Words would be set to 2. When the parameter being written to is a 32-bit REAL (floating point) data type, the size in words would be set to 2. See the drive documentation to determine the size of the parameter and its data type (16-bit or 32-bit integer or REAL).

## SLC 500 Example Write Single Request Data

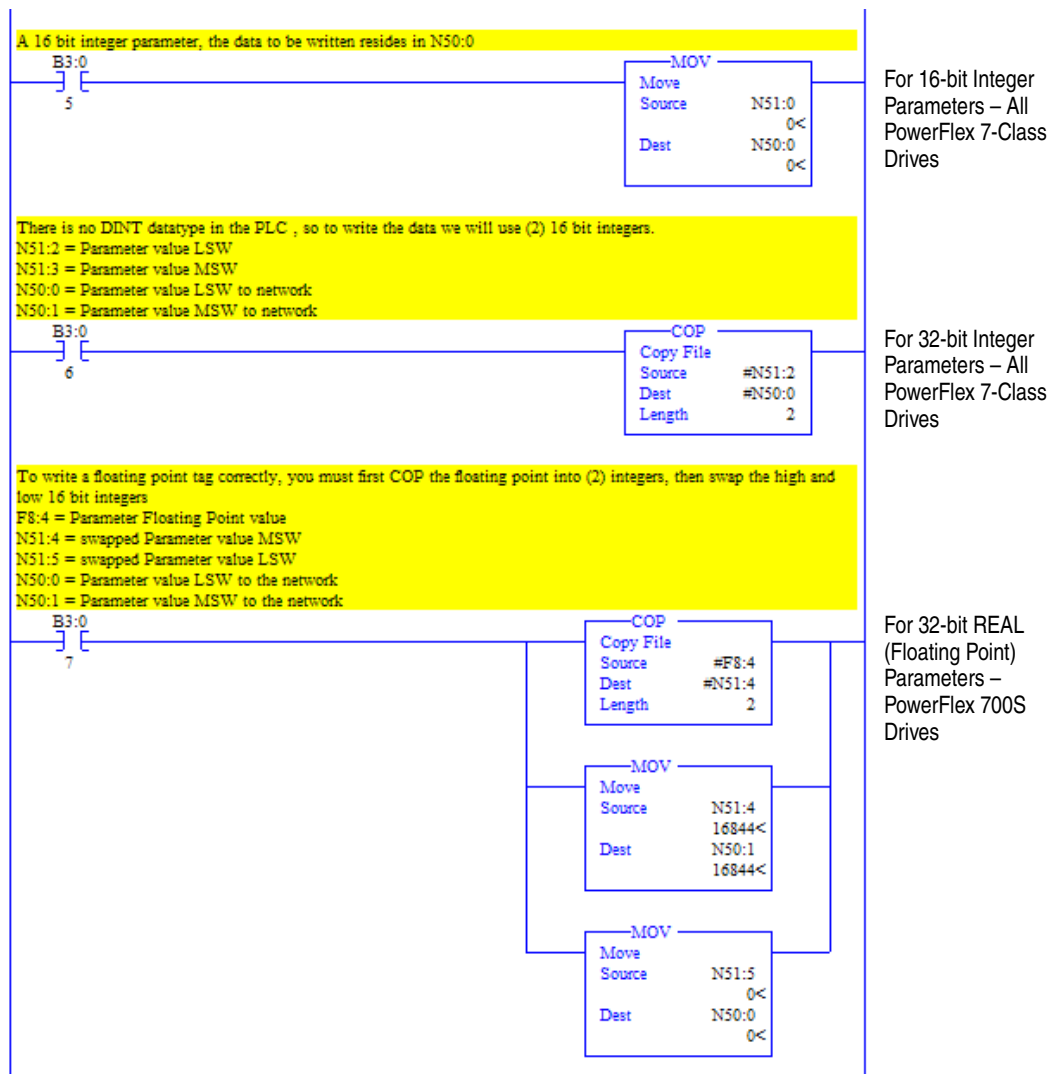
In this message example, we use the data table address in [Figure 6.40](#) to store the request value (10.0 sec.) that was written to drive parameter 140 - [Accel Time 1]. To determine the data type for the parameter and its required scaling, refer to the specific drive documentation.

**Figure 6.40 Example Write Single Request Data File**



[Figure 6.41](#) shows example ladder logic to correctly format the three possible data types for write messages in the SLC 500.

**Figure 6.41 Example Ladder Logic to Format Parameter Data Types for Writes**



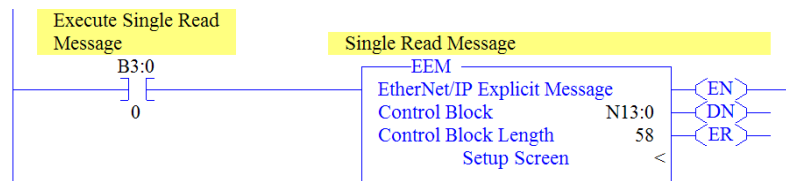
## SLC 500 Explicit Messaging Using the Generic Get/Set Attribute Service

### SLC 500 Example Ladder Logic Program to Read a Single Parameter

A Generic Get Attribute Single message is used to read a single parameter. This read message example reads the value of parameter 003 - [Output Current] in a PowerFlex 7-Class drive.

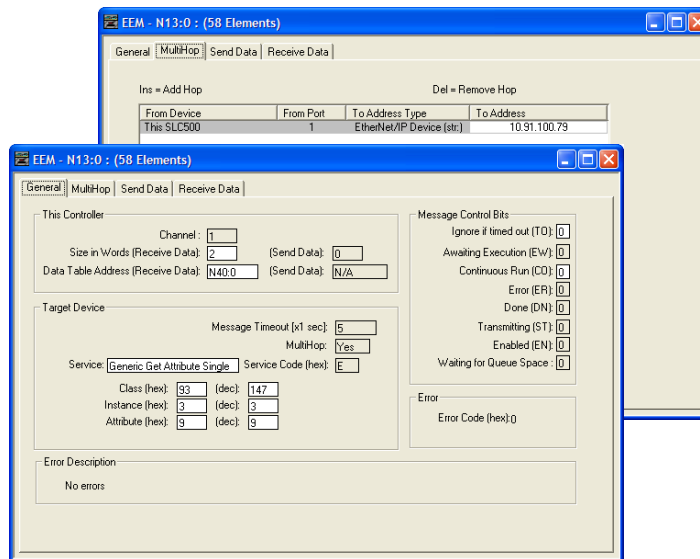
**Important:** See [Table 6.A on page 6-2](#) for limitations of PowerFlex 7-Class and PowerFlex 750-Series drives when using Class code 0x93 or Class code 0x9F for explicit messaging.

**Figure 6.42 Example Ladder Logic to Read a Single Parameter**



## SLC 500 – Formatting a Message to Read a Single Parameter Using Generic Get/Set Attribute Service

**Figure 6.43 Generic Get Attribute Single Message Configuration Screens**



The following table identifies the data that is required in each box to configure a message to read a single parameter.

| General Tab             | Example Value                  | Description                                                                                                                            |
|-------------------------|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Size in Words           | 2 <sup>(3)</sup>               | Number of words to be transferred. Each word size is a 16-bit integer.                                                                 |
| Data Table Address      | N40:0                          | An unused controller data table address containing the message instruction. This address is the starting word of the destination file. |
| Service <sup>(1)</sup>  | Generic Get Attribute Single   | Code for the requested service.                                                                                                        |
| Class                   | 93 or 9F (Hex.) <sup>(4)</sup> | Class ID for the DPI Parameter Object.                                                                                                 |
| Instance <sup>(2)</sup> | 3 (Dec.)                       | Instance number is the same as the parameter number.                                                                                   |
| Attribute               | 9 (Dec.)                       | Attribute number for the Parameter Value attribute.                                                                                    |
| MultiHop Tab            | Example Value                  | Description                                                                                                                            |
| To Address              | 10.91.100.79                   | IP address of the adapter connected to the drive.                                                                                      |

<sup>(1)</sup> The default setting for Service is "Custom," enabling entry of a Service Code not available from the Service pull-down menu. When choosing a Service other than "Custom" from the pull-down menu, an appropriate Hex. value is automatically assigned to the Service Code box which is dimmed (unavailable).

<sup>(2)</sup> The instance is the parameter number in the drive (Port 0). For example, to read parameter 4 of a peripheral in Port 5 of a PowerFlex 750-Series drive, the instance would be 21504 + 4 = 21508. See [DPI Parameter Object on page C-16](#) (Class code 0x93) or [Host DPI Parameter Object on page C-30](#) (Class code 0x9F) to determine the instance number.

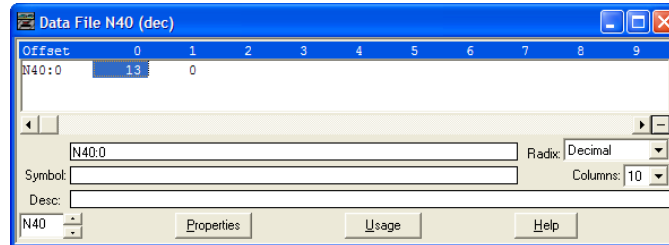
<sup>(3)</sup> In this example, Output Current is a 32-bit parameter. If the parameter being read is a 16-bit parameter, the Size in Words would be set to 1. When the parameter being read is a 32-bit REAL (floating point) data type, the size in words would be set to 2. See the drive documentation to determine the size of the parameter and its data type (16-bit or 32-bit integer or REAL).

<sup>(4)</sup> See [Table 6.A on page 6-2](#) for limitations of PowerFlex 7-Class and PowerFlex 750-Series drives when using DPI Parameter Object Class code 0x93 or Host DPI Parameter Object Class code 0x9F for explicit messaging.

### SLC 500 Example Get Attribute Single Response Data

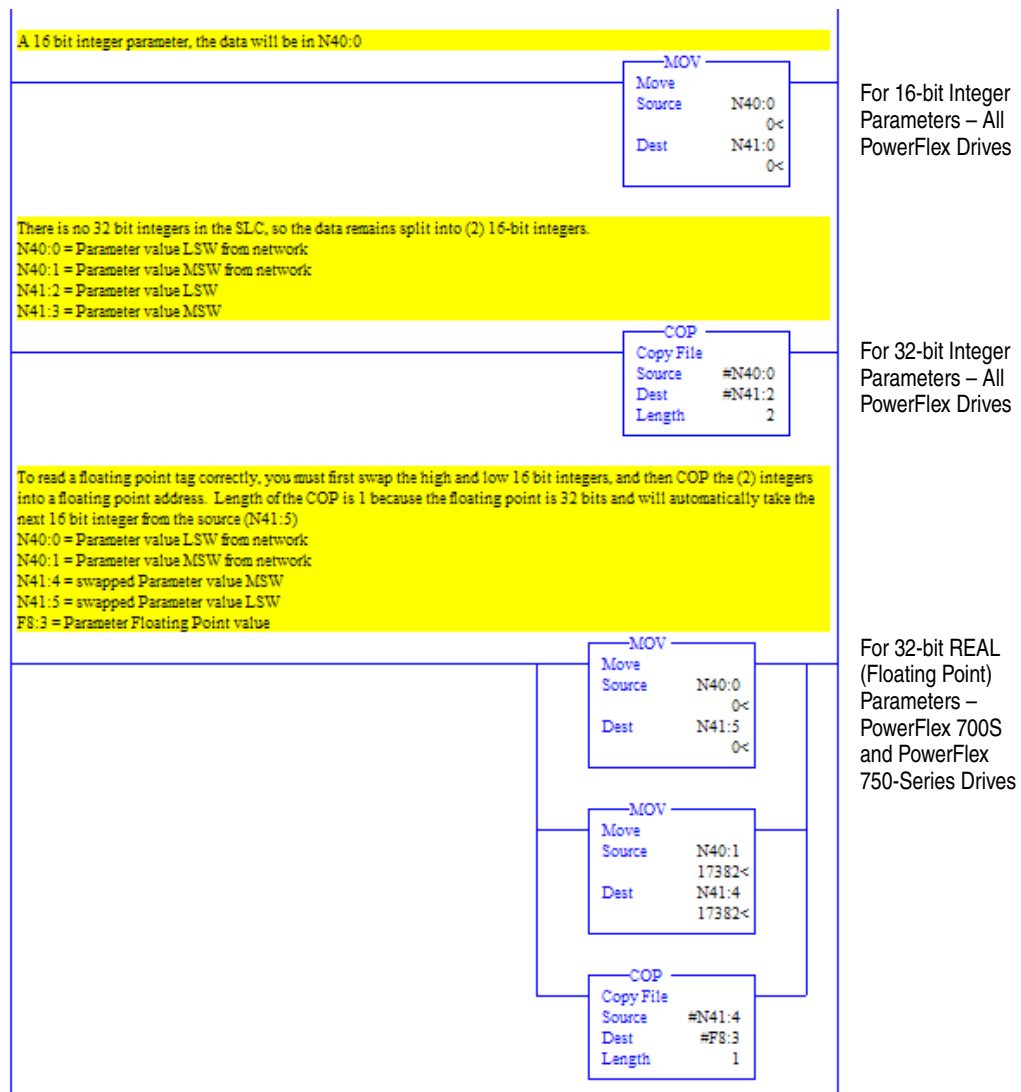
In this message example, we use the data table address in [Figure 6.44](#) to store the response value (0.13 amps) that was read from drive parameter 003 - [Output Current]. To determine the data type for the parameter and its required scaling, refer to the specific drive documentation.

**Figure 6.44 Example Get Attribute Single Response Data File**



[Figure 6.45](#) shows example ladder logic to correctly format the three possible data types for get messages in the SLC 500.

**Figure 6.45 Example Ladder Logic to Format Parameter Data Types for Gets**

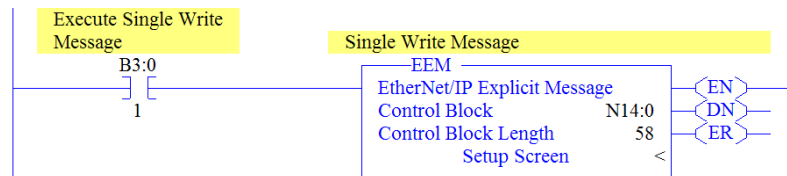


### SLC 500 Example Ladder Logic Program to Write a Single Parameter Using Generic Get/Set Attribute Service

A Generic Set Attribute Single message is used to write to a single parameter. This write message example writes a value to parameter 140 - [Accel Time 1] in a PowerFlex 7-Class drive.

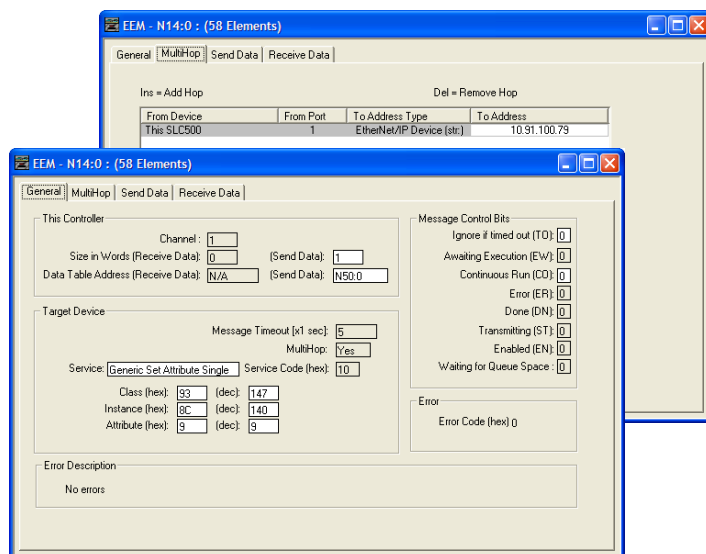
**Important:** See [Table 6.A on page 6-2](#) for limitations of PowerFlex 7-Class and PowerFlex 750-Series drives when using Class code 0x93 or Class code 0x9F for explicit messaging.

**Figure 6.46 Example Ladder Logic to Write a Single Parameter**



## SLC 500 – Formatting a Message to Write a Single Parameter Using Generic Get/Set Attribute Service

**Figure 6.47 Generic Set Attribute Single Message Configuration Screens**



The following table identifies the data that is required in each box to configure a message to write a single parameter.

| General Tab              | Example Value                  | Description                                                                                                                       |
|--------------------------|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| Size in Words            | 1 <sup>(4)</sup>               | Number of words to be transferred. Each word size is a 16-bit integer.                                                            |
| Data Table Address       | N50:0                          | An unused controller data table address containing the message instruction. This address is the starting word of the source file. |
| Service <sup>(1)</sup>   | Generic Set Attribute Single   | Code for the requested service.                                                                                                   |
| Class                    | 93 or 9F (Hex.) <sup>(5)</sup> | Class ID for the DPI Parameter Object.                                                                                            |
| Instance <sup>(2)</sup>  | 140 (Dec.)                     | Instance number is the same as the parameter number.                                                                              |
| Attribute <sup>(3)</sup> | 9 or 10 (Dec.)                 | Attribute number for the Parameter Value attribute.                                                                               |
| MultiHop Tab             | Example Value                  | Description                                                                                                                       |
| To Address               | 10.91.100.79                   | IP address of the adapter connected to the drive.                                                                                 |

<sup>(1)</sup> The default setting for Service is "Custom," enabling entry of a Service Code not available from the Service pull-down menu. When choosing a Service other than "Custom" from the pull-down menu, an appropriate Hex. value is automatically assigned to the Service Code box which is dimmed (unavailable).

<sup>(2)</sup> The instance is the parameter number in the drive (Port 0). For example, to write to parameter 4 of a peripheral in Port 5 of a PowerFlex 750-Series drive, the instance would be  $21504 + 4 = 21508$ . See [DPI Parameter Object on page C-16](#) (Class code 0x93) or [Host DPI Parameter Object on page C-30](#) (Class code 0x9F) to determine the instance number.

<sup>(3)</sup> Setting the Attribute value to "9" will write the parameter value to the drive's Non-Volatile Storage (EEPROM) memory, so the parameter value will remain even after the drive is power cycled. **Important:** When set to "9," be very cautious as the EEPROM may quickly exceed its life cycle and cause the drive to malfunction. Setting the Attribute value to "A" (10 decimal) will write the parameter value to temporary memory, so the parameter value will be lost after the drive is power cycled. It is recommended to use the "A" (10 decimal) setting when frequent write messages are required.

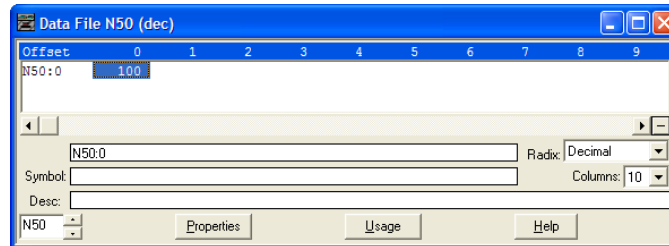
<sup>(4)</sup> In this example, Accel Time 1 is a 16-bit parameter. If the parameter being written to is a 32-bit parameter, the Size in Words would be set to 2. When the parameter being written to is a 32-bit REAL (floating point) data type, the size in words would be set to 2. See the drive documentation to determine the size of the parameter and its data type (16-bit or 32-bit integer or REAL).

<sup>(5)</sup> See [Table 6.A on page 6-2](#) for limitations of PowerFlex 7-Class and PowerFlex 750-Series drives when using DPI Parameter Object Class code 0x93 or Host DPI Parameter Object Class code 0x9F for explicit messaging.

### SLC 500 Example Set Attribute Single Request Data

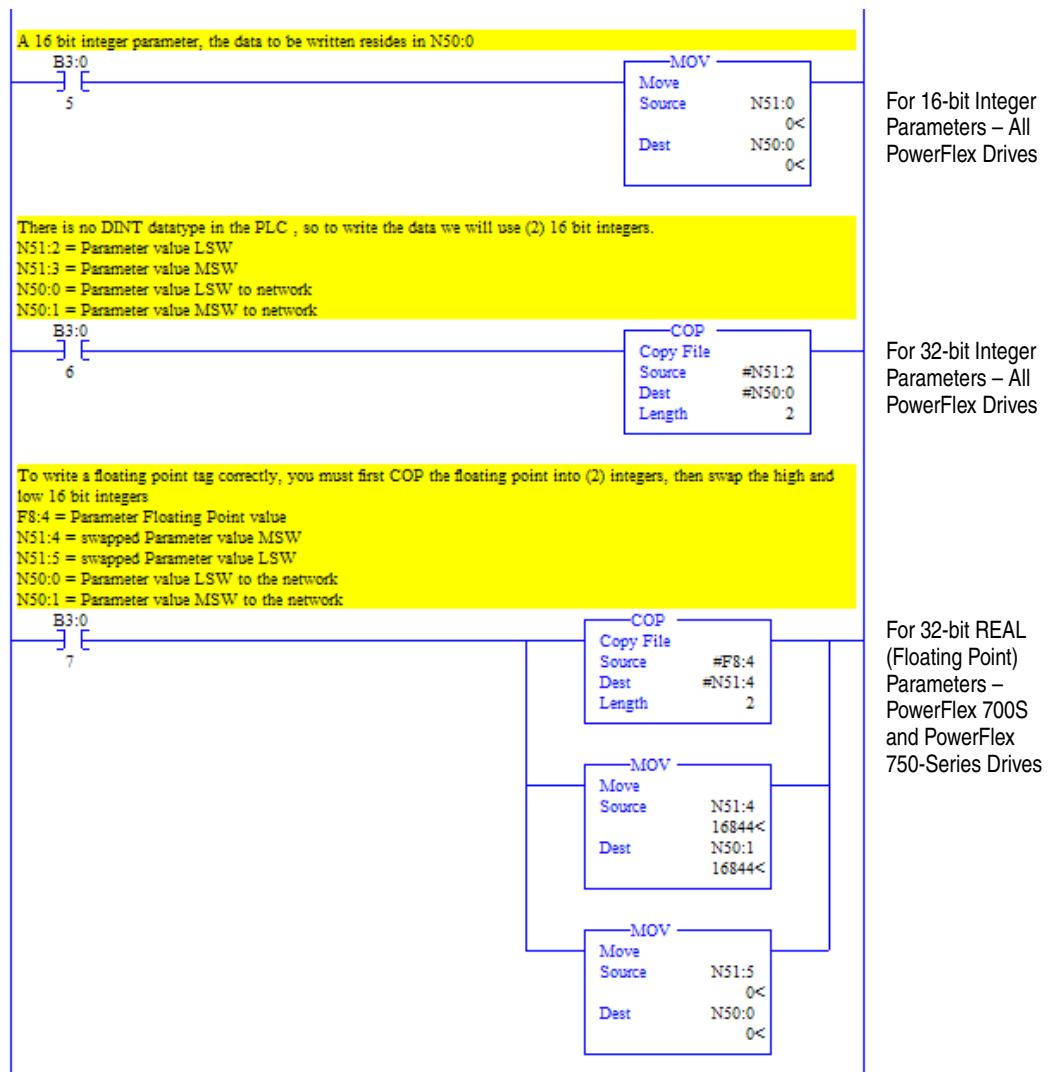
In this message example, we use the data table address in [Figure 6.48](#) to store the request value (10.0 sec.) that was written to drive parameter 140 - [Accel Time 1]. To determine the data type for the parameter and its required scaling, refer to the specific drive documentation.

**Figure 6.48 Example Set Attribute Single Request Data File**



[Figure 6.49](#) shows example ladder logic to correctly format the three possible data types for set messages in the SLC 500.

**Figure 6.49 Example Ladder Logic to Format Parameter Data Types for Sets**



### SLC 500 Example Ladder Logic Program to Read Multiple Parameters Using Generic Get/Set Attribute Service

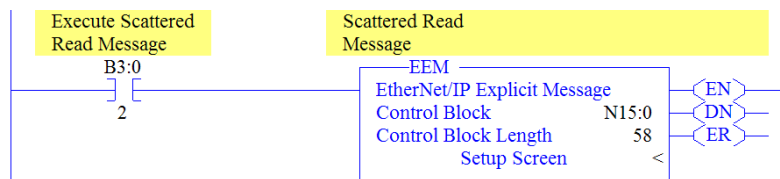
A Custom scattered read message is used to read the values of multiple parameters. This read message example reads the values of these five parameters:

| PowerFlex 7-Class Drive                                                                                                                                                                                                                                             | PowerFlex 750-Series Drive                                                                                                                                                                                                                                                       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Parameter 001 - [Output Freq]</li> <li>• Parameter 003 - [Output Current]</li> <li>• Parameter 006 - [Output Voltage]</li> <li>• Parameter 012 - [DC Bus Voltage]</li> <li>• Parameter 017 - [Analog In1 Value]</li> </ul> | <ul style="list-style-type: none"> <li>• Parameter 001 - [Output Freq]</li> <li>• Parameter 007 - [Output Current]</li> <li>• Parameter 137 - [Open Loop Fdbk]</li> <li>• Parameter 21581 - [Port 5: Analog Out 0 Data]</li> <li>• Parameter 260 - [Analog In0 Value]</li> </ul> |

Refer to [DPI Parameter Object on page C-16](#) (Class code 0x93) or [Host DPI Parameter Object on page C-30](#) (Class code 0x9F) for parameter numbering.

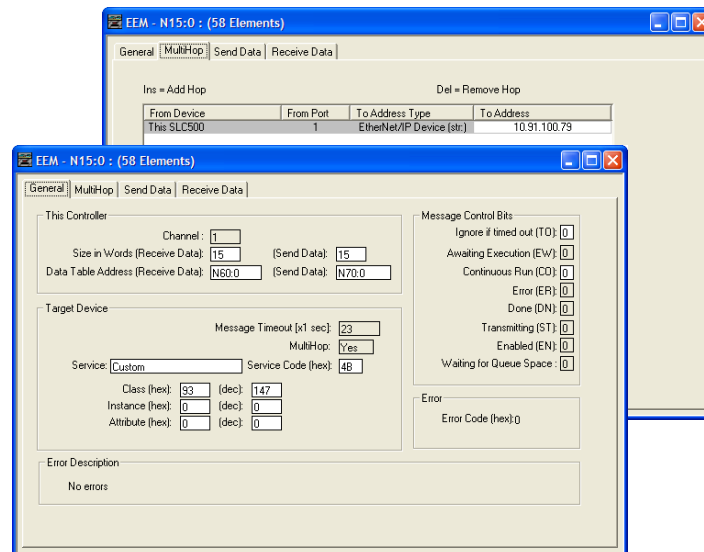
**Important:** See [Table 6.A on page 6-2](#) for limitations of PowerFlex 7-Class and PowerFlex 750-Series drives when using Class code 0x93 or Class code 0x9F for explicit messaging.

**Figure 6.50 Example Ladder Logic to Read Multiple Parameters**



## SLC 500 – Formatting a Message to Read Multiple Parameters Using Generic Get/Set Attribute Service

**Figure 6.51 Custom Scattered Read Message Configuration Screens**



The following table identifies the data that is required in each box to configure a message to read multiple parameters.

| General Tab            | Example Value                  | Description                                                                                                                            |
|------------------------|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Size in Words          | 15 <sup>(2)</sup>              | Number of words to be transferred. Each word size is a 16-bit integer.                                                                 |
| Data Table Address     | N60:0                          | An unused controller data table address containing the message instruction. This address is the starting word of the destination file. |
| Service <sup>(1)</sup> | Custom                         | Required for scattered messages.                                                                                                       |
| Service Code           | 4B (Hex.)                      | Code for the requested service.                                                                                                        |
| Class                  | 93 or 9F (Hex.) <sup>(3)</sup> | Class ID for the DPI Parameter Object.                                                                                                 |
| Instance               | 0 (Dec.)                       | Required for scattered messages.                                                                                                       |
| Attribute              | 0 (Dec.)                       | Required for scattered messages.                                                                                                       |
| MultiHop Tab           | Example Value                  | Description                                                                                                                            |
| To Address             | 10.91.100.79                   | IP address of the adapter connected to the drive.                                                                                      |

<sup>(1)</sup> The default setting for Service is "Custom," enabling entry of a Service Code not available from the Service pull-down menu. When choosing a Service other than "Custom" from the pull-down menu, an appropriate Hex. value is automatically assigned to the Service Code box which is dimmed (unavailable).

<sup>(2)</sup> In this example, we are reading five parameters. Each parameter being read requires three contiguous 16-bit words. Scattered read messages always assume that every parameter being read is a 32-bit parameter, regardless of its actual size. The data structure format is the same as shown on [page 6-52](#). Maximum length is 66 words, which equates to 22 parameters. For parameter numbering, see [DPI Parameter Object on page C-16](#) (Class code 0x93) or [Host DPI Parameter Object on page C-30](#) (Class code 0x9F).

<sup>(3)</sup> See [Table 6.A on page 6-2](#) for limitations of PowerFlex 7-Class and PowerFlex 750-Series drives when using DPI Parameter Object Class code 0x93 or Host DPI Parameter Object Class code 0x9F for explicit messaging.

SLC 500 Example Scattered Read Request Data

In this message example, we use the data table addresses in [Figure 6.52](#) or [Figure 6.53](#) to store the request values to be read from these drive parameters:

| PowerFlex 7-Class Drive                                                                                                                                                                                                                                       | PowerFlex 750-Series Drive                                                                                                                                                                                                                                                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"><li>• Parameter 001 - [Output Freq]</li><li>• Parameter 003 - [Output Current]</li><li>• Parameter 006 - [Output Voltage]</li><li>• Parameter 012 - [DC Bus Voltage]</li><li>• Parameter 017 - [Analog In1 Value]</li></ul> | <ul style="list-style-type: none"><li>• Parameter 001 - [Output Freq]</li><li>• Parameter 007 - [Output Current]</li><li>• Parameter 137 - [Open Loop Fdbk]</li><li>• Parameter 21581 - [Port 5: Analog Out 0 Data]</li><li>• Parameter 260 - [Analog In0 Value]</li></ul> |

Refer to [DPI Parameter Object on page C-16](#) (Class code 0x93) or [Host DPI Parameter Object on page C-30](#) (Class code 0x9F) for parameter numbering.

Figure 6.52 Example Scattered Read Request Data File for PowerFlex 7-Class Drive

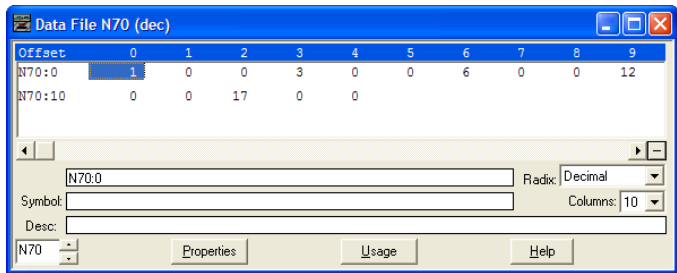
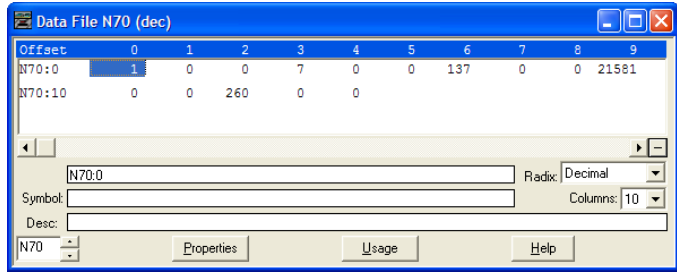


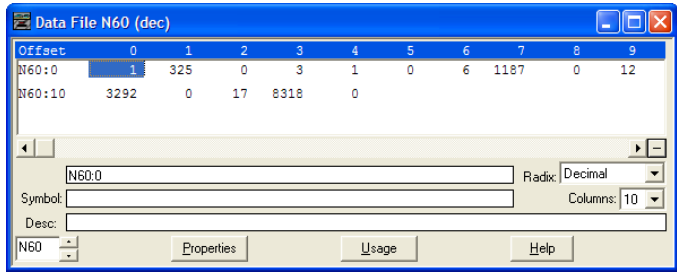
Figure 6.53 Example Scattered Read Request Data File for PowerFlex 750-Series Drive



SLC 500 Example Scattered Read Response Data

In this message example, we use the data table addresses in [Figure 6.54](#) or [Figure 6.55](#) to store the response values that were read from the requested drive parameters.

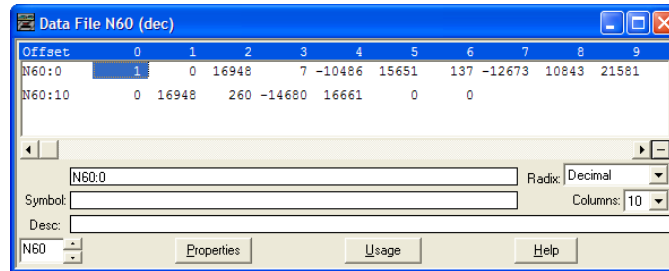
Figure 6.54 Example Scattered Read Response Data File for PowerFlex 7-Class Drive



In this example, the parameters have the following values:

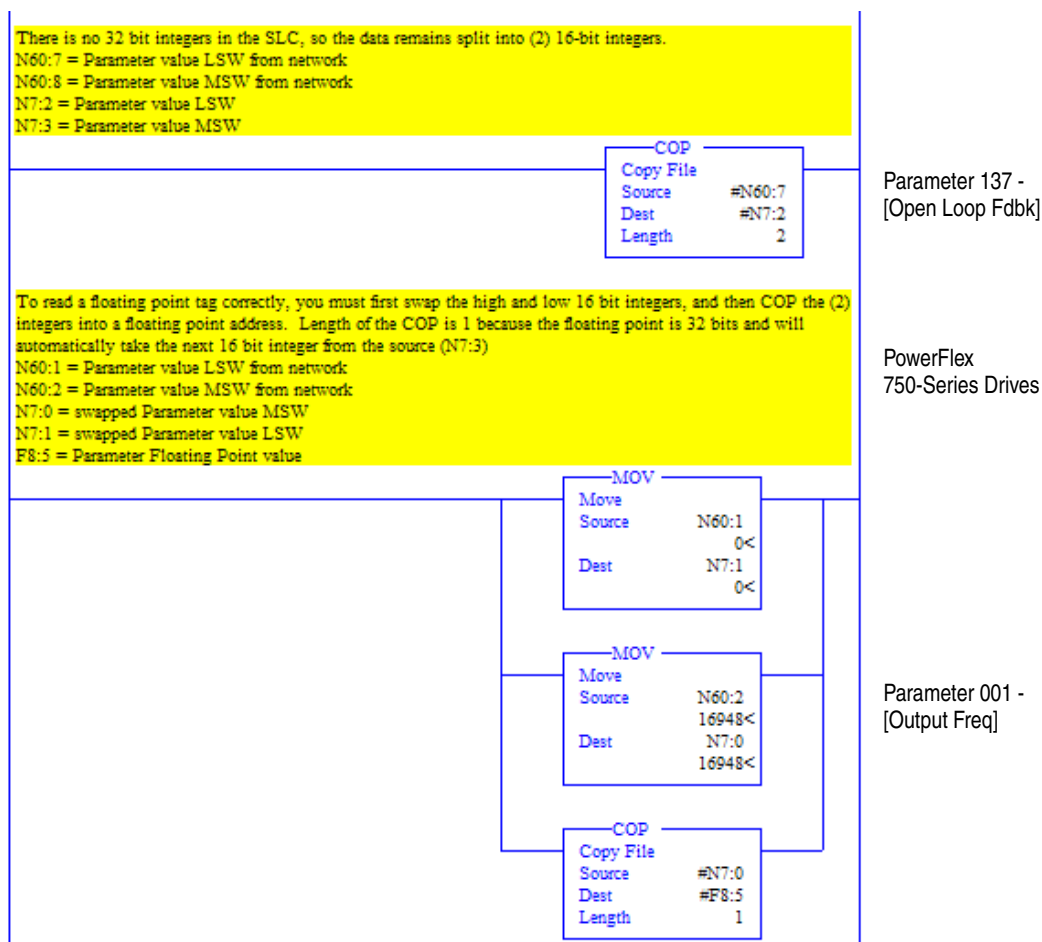
| PowerFlex 7-Class Drive Parameter | Address | Read Value |
|-----------------------------------|---------|------------|
| 1 - [Output Freq]                 | N60:1   | 32.5 Hz    |
| 3 - [Output Current]              | N60:4   | 0.01 Amp   |
| 6 - [Output Voltage]              | N60:7   | 118.7 VAC  |
| 12 - [DC Bus Voltage]             | N60:10  | 329.2 VDC  |
| 17 - [Analog In2 Value]           | N60:13  | 8.318 mA   |

**Figure 6.55 Example Scattered Read Response Data File for PowerFlex 750-Series Drive**



The PowerFlex 750-Series drive uses 32-bit integer and REAL parameters. A COP command must be used to copy the N60 integer array to a 16-bit integer or floating tag. [Figure 6.56](#) shows the ladder logic used for this example. If the parameter data type is a 32-bit integer, the data remains split into two 16-bit integers since there are no 32-bit integers in the SLC 500. If the parameter data type is a REAL, then the destination tag is a floating point. In this case, the value must first be swapped with the high and low 16-bit integers, and then the two integers copied (COP) into a floating point address. See the drive documentation to determine the parameter data type (32-bit integer or REAL).

**Figure 6.56 Example Ladder Logic to Copy Response Data for PowerFlex 750-Series Drive**



In this message example, the parameters have the following values:

| PowerFlex 750-Series Drive Parameter | Read Value  | Data Type |
|--------------------------------------|-------------|-----------|
| 1 - [Output Freq]                    | 45.0 Hz     | REAL      |
| 7 - [Output Current]                 | 0.04 Amp    | REAL      |
| 137 - [Open Loop Fdbk]               | 710659711   | DINT      |
| 21581 - [Port 5: Analog Out 0 Data]  | 45.0 Hz     | REAL      |
| 260 - [Analog In0 Value]             | 9.361 Volts | REAL      |

### SLC 500 Example Ladder Logic Program to Write Multiple Parameters Using Generic Get/Set Attribute Service

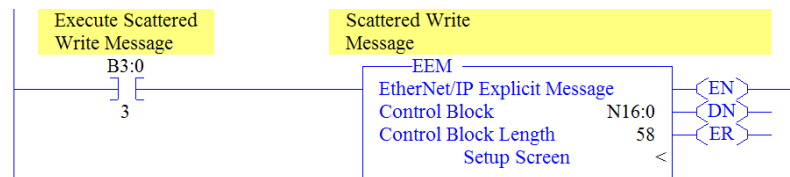
A Custom scattered write message is used to write to multiple parameters. This write message example writes the following values to these five parameters:

| PowerFlex 7-Class Drive Parameter | Write Value | PowerFlex 750-Series Drive Parameter | Write Value |
|-----------------------------------|-------------|--------------------------------------|-------------|
| 141 - [Accel Time 2]              | 11.1 Sec.   | 536 - [Accel Time 2]                 | 11.1 Sec.   |
| 143 - [Decel Time 2]              | 22.2 Sec.   | 538 - [Decel Time 2]                 | 22.2 Sec.   |
| 105 - [Preset Speed 5]            | 33.3 Hz.    | 725 - [Zero Position]                | 33          |
| 106 - [Preset Speed 6]            | 44.4 Hz.    | 21555 - [Port 5: Analog In0 Hi]      | 5.5         |
| 107 - [Preset Speed 7]            | 55.5 Hz.    | 780 - [PTP Setpoint]                 | -75,555     |

Refer to [DPI Parameter Object on page C-16](#) (Class code 0x93) or [Host DPI Parameter Object on page C-30](#) (Class code 0x9F) for parameter numbering.

**Important:** See [Table 6.A on page 6-2](#) for limitations of PowerFlex 7-Class and PowerFlex 750-Series drives when using Class code 0x93 or Class code 0x9F for explicit messaging.

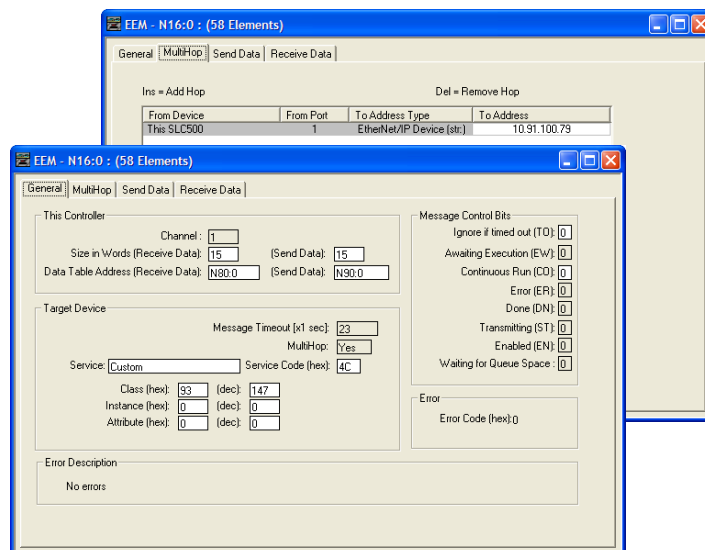
**Figure 6.57 Example Ladder Logic to Write Multiple Parameters**



**Important:** If the explicit message scattered write must be written continuously, then use a separate Generic Set service explicit message single write for each parameter using DPI Parameter Object Class code 0x93 or Host DPI Parameter Object Class code 0x9F and attribute A (10 decimal; see [page 6-40](#)). Attribute A writes to RAM—not NVS (EEPROM) memory. This example scattered write message using attribute 0 writes to NVS. Over time, continuous writes will exceed the EEPROM life cycle and cause the drive to malfunction.

## SLC 500 – Formatting a Message to Write Multiple Parameters Using Generic Get/Set Attribute Service

**Figure 6.58 Custom Scattered Write Multiple Message Configuration Screens**



The following table identifies the data that is required in each box to configure a message to write multiple parameters.

| General Tab            | Example Value                  | Description                                                                                                                       |
|------------------------|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| Size in Words          | 15 <sup>(2)</sup>              | Number of words to be transferred. Each word size is a 16-bit integer.                                                            |
| Data Table Address     | N80:0                          | An unused controller data table address containing the message instruction. This address is the starting word of the source file. |
| Service <sup>(1)</sup> | Custom                         | Required for scattered messages.                                                                                                  |
| Service Code           | 4C (Hex.)                      | Code for the requested service.                                                                                                   |
| Class                  | 93 or 9F (Hex.) <sup>(3)</sup> | Class ID for the DPI Parameter Object.                                                                                            |
| Instance               | 0 (Dec.)                       | Required for scattered messages.                                                                                                  |
| Attribute              | 0 (Dec.)                       | Required for scattered messages.                                                                                                  |
| MultiHop Tab           | Example Value                  | Description                                                                                                                       |
| To Address             | 10.91.100.79                   | IP address of the adapter connected to the drive.                                                                                 |

- <sup>(1)</sup> The default setting for Service is "Custom," enabling entry of a Service Code not available from the Service pull-down menu. When choosing a Service other than "Custom" from the pull-down menu, an appropriate Hex. value is automatically assigned to the Service Code box which is dimmed (unavailable).
- <sup>(2)</sup> In this example, we are writing to five parameters. Each parameter being written to requires three contiguous 16-bit words. Scattered write messages always assume that every parameter being written to is a 32-bit parameter, regardless of its actual size. The data structure format is the same as shown on [page 6-52](#). Maximum length is 66 words, which equates to 22 parameters. For parameter numbering, see [DPI Parameter Object on page C-16](#) (Class code 0x93) or [Host DPI Parameter Object on page C-30](#) (Class code 0x9F).
- <sup>(3)</sup> See [Table 6.A on page 6-2](#) for limitations of PowerFlex 7-Class and PowerFlex 750-Series drives when using DPI Parameter Object Class code 0x93 or Host DPI Parameter Object Class code 0x9F for explicit messaging.

### SLC 500 Example Scattered Write Request Data

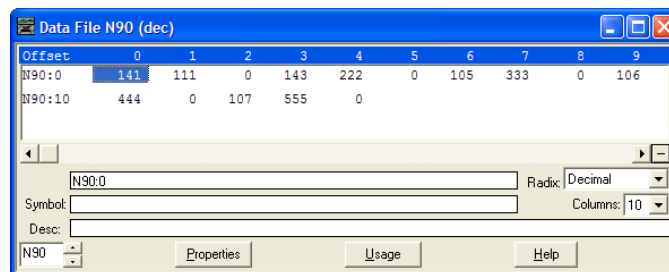
In this message example, we use the data table addresses in [Figure 6.59](#) or to store the request values to be written to these drive parameters:

| PowerFlex 7-Class Drive Parameter | Address | Write Value | PowerFlex 750-Series Drive Parameter | Write Value | Data Type      |
|-----------------------------------|---------|-------------|--------------------------------------|-------------|----------------|
| 141 - [Accel Time 2]              | N90:1   | 11.1 Sec.   | 536 - [Accel Time 2]                 | 11.1 Sec.   | REAL           |
| 143 - [Decel Time 2]              | N90:4   | 22.2 Sec.   | 538 - [Decel Time 2]                 | 22.2 Sec.   | REAL           |
| 105 - [Preset Speed 5]            | N90:7   | 33.3 Hz.    | 725 - [Zero Position]                | 33          | 32-bit integer |
| 106 - [Preset Speed 6]            | N90:10  | 44.4 Hz.    | 21555 - [Port 5: Analog In0 Hi]      | 5.5         | REAL           |
| 107 - [Preset Speed 7]            | N90:13  | 55.5 Hz.    | 780 - [PTP Setpoint]                 | -75,555     | 32-bit integer |

Refer to [DPI Parameter Object on page C-16](#) (Class code 0x93) or [Host DPI Parameter Object on page C-30](#) (Class code 0x9F) for parameter numbering.

[Figure 6.59](#) or [Figure 6.62](#) shows the parameter values.

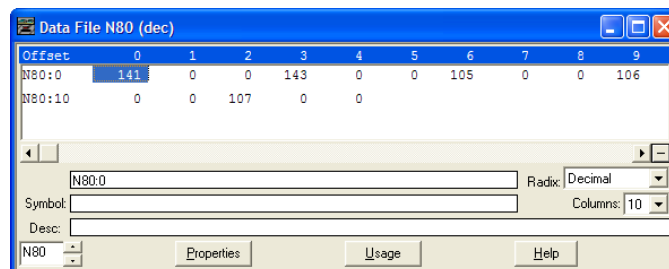
**Figure 6.59 Example Scattered Write Request Data File for PowerFlex 7-Class Drive**



### SLC 500 Example Scattered Write Response Data

In this message example, we use the data table addresses in [Figure 6.60](#) to store the response values that were written to the requested drive parameters. Values of “0” indicate no errors occurred.

**Figure 6.60 Example Scattered Write Response Data File for PowerFlex 7-Class Drive**



The PowerFlex 750-Series drive uses 32-bit integer and REAL parameters. A COP command must be used to copy the 16-bit integer or REAL values to the N90 integer array. [Figure 6.61](#) shows the ladder logic used for this example. If the parameter data type is a 32-bit integer, the data remains split into two 16-bit integers since there are no 32-bit integers in the SLC 500. If the parameter data type is a REAL, the floating point value in the SLC 500

is copied (COP) to two 16-bit integers. Then the MSW (most significant word) and LSW (least significant word) must be swapped before moving (MOV) the values to the array to be written to. See the drive documentation to determine the parameter data type (32-bit integer or REAL).

**Figure 6.61 Example Ladder Logic to Copy Request Data for PowerFlex 750-Series Drive**

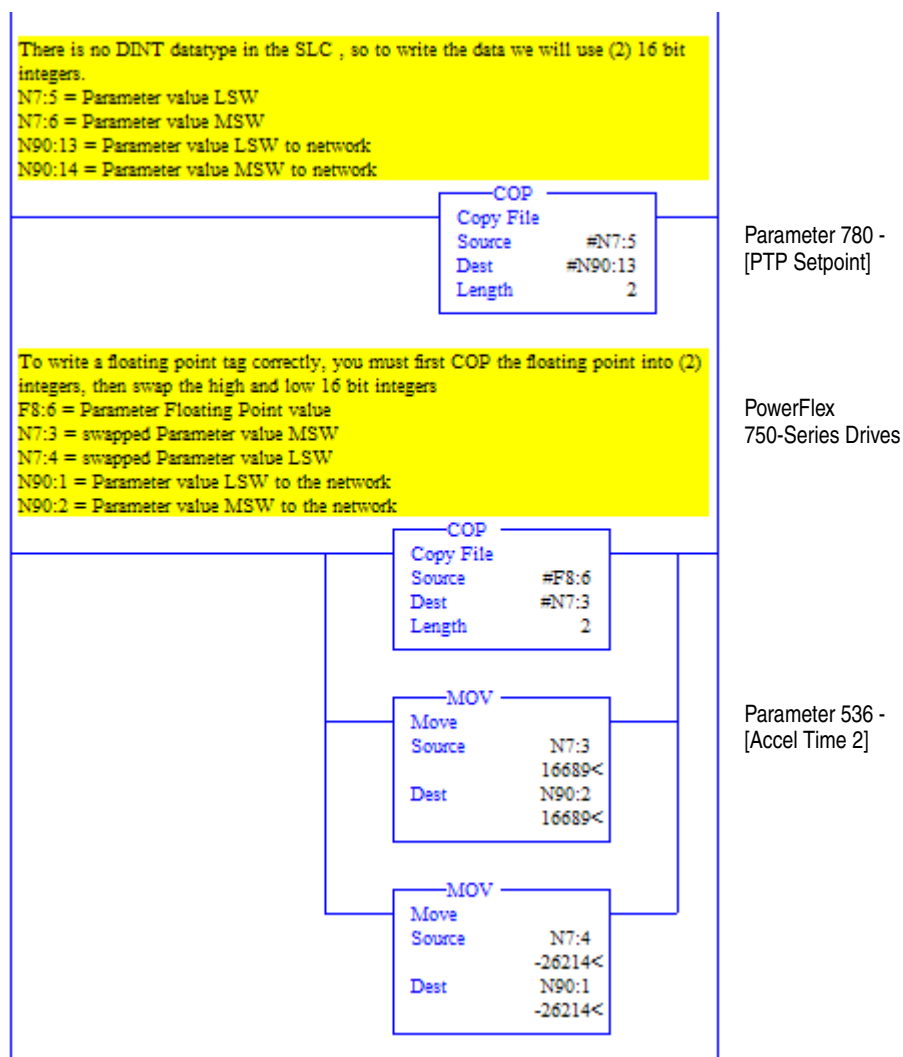


**Figure 6.62 Example Scattered Write Request Data File for PowerFlex 750-Series Drive**

| Offset | 0   | 1      | 2     | 3      | 4      | 5     | 6   | 7  | 8 | 9     |
|--------|-----|--------|-------|--------|--------|-------|-----|----|---|-------|
| N90:0  | 536 | -26214 | 16689 | 538    | -26214 | 16817 | 725 | 33 | 0 | 21555 |
| N90:10 | 0   | 16560  | 780   | -10019 | -2     |       |     |    |   |       |

The results of the explicit message appear in the destination tag array N80 (Figure 6.63). Values of “0” indicate no errors occurred.

**Figure 6.63 Example Scattered Write Response Data File for PowerFlex 750-Series Drive**

| Offset | 0   | 1 | 2   | 3   | 4 | 5 | 6   | 7 | 8 | 9     |
|--------|-----|---|-----|-----|---|---|-----|---|---|-------|
| N80:0  | 536 | 0 | 0   | 538 | 0 | 0 | 725 | 0 | 0 | 21555 |
| N80:10 | 0   | 0 | 780 | 0   | 0 |   |     |   |   |       |

## SLC 500 – Explanation of Request and Response Data for Read/Write Multiple Messaging

The data structures in [Figure 6.64](#) and [Figure 6.65](#) use 16-bit words and can accommodate up to 22 parameters in a single message. In the Response Message, a parameter number with the high bit set indicates that the associated parameter value field contains an error code (parameter number in response data will be negative).

**Important:** See [Table 6.A on page 6-2](#) for limitations of PowerFlex 7-Class and PowerFlex 750-Series drives when using Class code 0x93 or Class code 0x9F for explicit messaging.

**Figure 6.64 Data Structures for Scattered Read Messages**

| Request (Source Data) |                  | Response (Destination Data) |                     |
|-----------------------|------------------|-----------------------------|---------------------|
| Word 0                | Parameter Number | Word 0                      | Parameter Number    |
| 1                     | Pad Word         | 1                           | Parameter Value LSW |
| 2                     | Pad Word         | 2                           | Parameter Value MSW |
| 3                     | Parameter Number | 3                           | Parameter Number    |
| 4                     | Pad Word         | 4                           | Parameter Value LSW |
| 5                     | Pad Word         | 5                           | Parameter Value MSW |
| 6                     | Parameter Number | 6                           | Parameter Number    |
| 7                     | Pad Word         | 7                           | Parameter Value LSW |
| 8                     | Pad Word         | 8                           | Parameter Value MSW |
| 9                     | Parameter Number | 9                           | Parameter Number    |
| 10                    | Pad Word         | 10                          | Parameter Value LSW |
| 11                    | Pad Word         | 11                          | Parameter Value MSW |
| 12                    | Parameter Number | 12                          | Parameter Number    |
| 13                    | Pad Word         | 13                          | Parameter Value LSW |
| 14                    | Pad Word         | 14                          | Parameter Value MSW |
| :                     |                  | :                           |                     |
| 63                    | Parameter Number | 63                          | Parameter Number    |
| 64                    | Pad Word         | 64                          | Parameter Value LSW |
| 65                    | Pad Word         | 65                          | Parameter Value MSW |

**Figure 6.65 Data Structures for Scattered Write Messages**

| Request (Source Data) |                     | Response (Destination Data) |                  |
|-----------------------|---------------------|-----------------------------|------------------|
| Word 0                | Parameter Number    | Word 0                      | Parameter Number |
| 1                     | Parameter Value LSW | 1                           | Pad Word         |
| 2                     | Parameter Value MSW | 2                           | Pad Word         |
| 3                     | Parameter Number    | 3                           | Parameter Number |
| 4                     | Parameter Value LSW | 4                           | Pad Word         |
| 5                     | Parameter Value MSW | 5                           | Pad Word         |
| 6                     | Parameter Number    | 6                           | Parameter Number |
| 7                     | Parameter Value LSW | 7                           | Pad Word         |
| 8                     | Parameter Value MSW | 8                           | Pad Word         |
| 9                     | Parameter Number    | 9                           | Parameter Number |
| 10                    | Parameter Value LSW | 10                          | Pad Word         |
| 11                    | Parameter Value MSW | 11                          | Pad Word         |
| 12                    | Parameter Number    | 12                          | Parameter Number |
| 13                    | Parameter Value LSW | 13                          | Pad Word         |
| 14                    | Parameter Value MSW | 14                          | Pad Word         |
| :                     |                     | :                           |                  |
| 63                    | Parameter Number    | 63                          | Parameter Number |
| 64                    | Parameter Value LSW | 64                          | Pad Word         |
| 65                    | Parameter Value MSW | 65                          | Pad Word         |

## MicroLogix 1100/1400 Examples

When using RSLogix 500 version 7.10 or earlier, explicit messaging must be performed using the PCCC N-File method. For RSLogix 500 version 7.20 or later, the CIP messaging method has been added along with the PCCC N-File method. However, it is recommended to use the CIP method because it is easier to use and understand. For this reason, only instructions for the CIP method are provided. If you must use the PCCC N-File method, refer to the [PLC-5 Examples on page 6-23](#).

The CIP messaging method provides two ways to perform explicit messaging:

- Read/Write Parameter Service simplifies setup by requiring less data to be entered in message configuration screens. However, the Read/Write Parameter Service can only be used to perform single parameter read or single parameter write explicit messages. (Multiple parameter reads or writes must be performed using the Generic Get/Set Attribute Service described below.)

**Important:** When performing a Write Parameter message, the data will always be written to the drive's Non-Volatile Storage (NVS). Continuous NVS writes may damage the drive's EEPROM. If continuous writes are necessary, use the Generic Set Attribute Single Service and attribute A (10 decimal; see [page 6-64](#)).

- Generic Get/Set Attribute Service requires more setup data to be entered in message configuration screens, but can be used to perform single parameter read or write and multiple parameter read or write explicit messages. Also, the Generic Set Attribute Service offers the choice of writing the data to the drive's Non-Volatile Storage (NVS) or the drive's Random Access Memory (RAM; for Generic Set Attribute Single service only, see [page 6-64](#)). Note that when selecting the data to be written to RAM, the data will be lost if the drive loses power.

For supported classes, instances, and attributes, refer to [Appendix C, EtherNet/IP Objects](#).

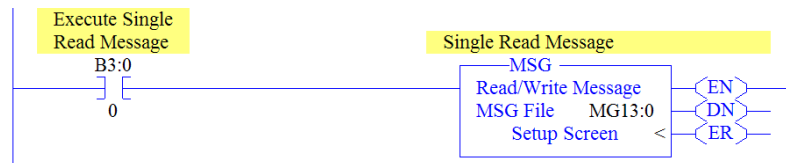
## MicroLogix 1100/1400 Explicit Messaging Using the Read/Write Parameter Service

MicroLogix 1100/1400 Example Ladder Logic Program to Read a Single Parameter

A Read Parameter message is used to read a single parameter. This read message example reads the value of parameter 003 - [Output Current] in a PowerFlex 7-Class drive.

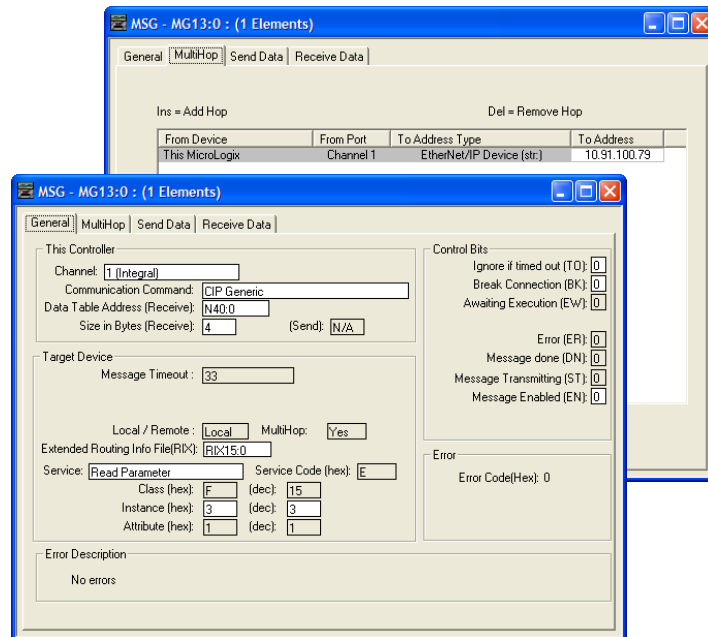
**Important:** Parameter Object Class code 0x0F is not supported in PowerFlex 750-Series drives. To do a single parameter read, follow the MicroLogix 1100/1400 (Generic Attribute Service) single read example on [page 6-60](#).

**Figure 6.66 Example Ladder Logic to Read a Single Parameter**



## MicroLogix 1100/1400 – Formatting a Message to Read a Single Parameter Using Read/Write Parameter Service

**Figure 6.67 Read Parameter Message Configuration Screens**



The following table identifies the data that is required in each box to configure a message to read a single parameter.

| General Tab             | Example Value    | Description                                                                                                                            |
|-------------------------|------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Channel                 | 1                | Controller port to which the network is connected.                                                                                     |
| Comm... Command         | CIP Generic      | Used to access the Parameter Object in the adapter.                                                                                    |
| Data Table Address      | N40:0            | An unused controller data table address containing the message instruction. This address is the starting word of the destination file. |
| Size in Bytes           | 4 <sup>(3)</sup> | Number of bytes to be transferred. Each byte size is an 8-bit integer.                                                                 |
| Extended Routing...     | RIX15:0          | An unused routing information file for the controller.                                                                                 |
| Service <sup>(1)</sup>  | Read Parameter   | Code for the requested service.                                                                                                        |
| Instance <sup>(2)</sup> | 3 (Dec.)         | Instance number is the same as the parameter number.                                                                                   |
| MultiHop Tab            | Example Value    | Description                                                                                                                            |
| To Address              | 10.91.100.79     | IP address of the adapter connected to the drive.                                                                                      |

<sup>(1)</sup> The default setting for Service is "Custom," enabling entry of a Service Code not available from the Service pull-down menu. When choosing a Service other than "Custom" from the pull-down menu, an appropriate Hex. value is automatically assigned to the Service Code box which is dimmed (unavailable).

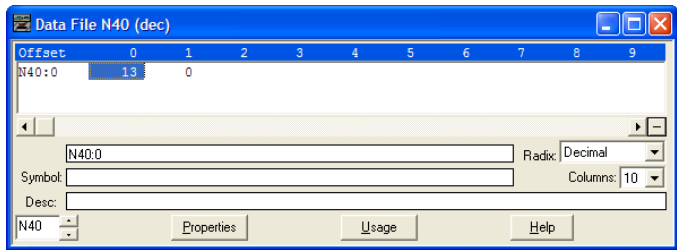
<sup>(2)</sup> Only drive parameters (Port 0) can be read using Parameter Object Class code 0x0F. To read a parameter of a peripheral in another port, use DPI Parameter Object Class code 0x93 (see [page 6-60](#)).

<sup>(3)</sup> In this example, Output Current is a 32-bit parameter. If the parameter being read is a 16-bit parameter, the Size in Bytes would be set to 2. When the parameter being read is a 32-bit REAL (floating point) data type, the size in bytes would be set to 4. See the drive documentation to determine the size of the parameter and its data type (16-bit or 32-bit integer or REAL).

MicroLogix 1100/1400 Example Read Single Response Data

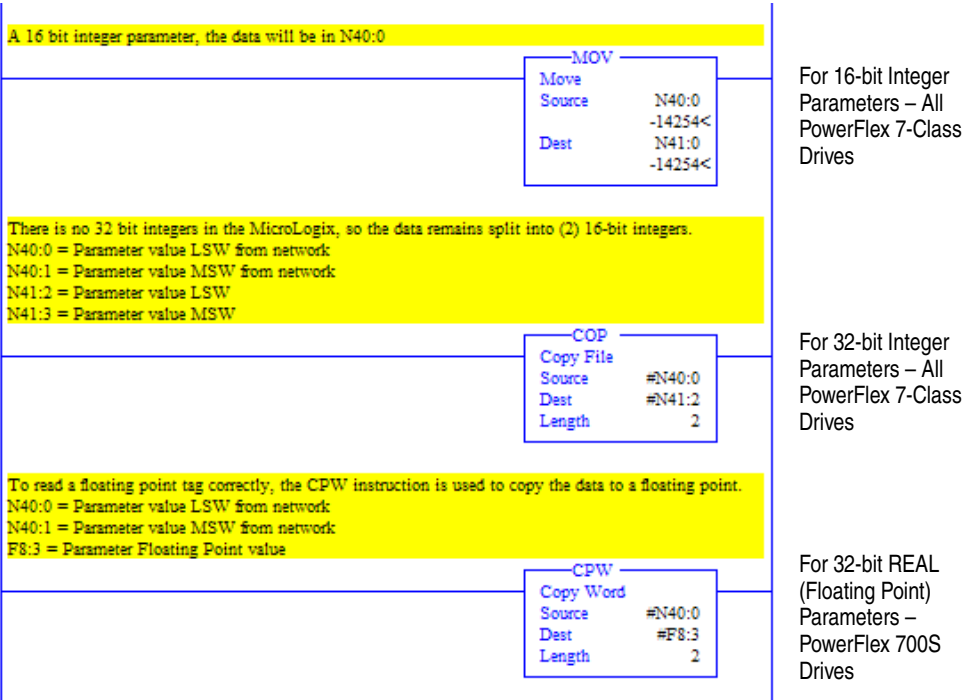
In this message example, we use the data table address in [Figure 6.68](#) to store the response value (0.13 amps) that was read from drive parameter 003 - [Output Current]. To determine the data type for the parameter and its required scaling, refer to the specific drive documentation.

Figure 6.68 Example Read Single Response Data File



[Figure 6.69](#) shows example ladder logic to correctly format the three possible data types for read messages in the MicroLogix 1100/1400.

Figure 6.69 Example Ladder Logic to Format Parameter Data Types for Reads

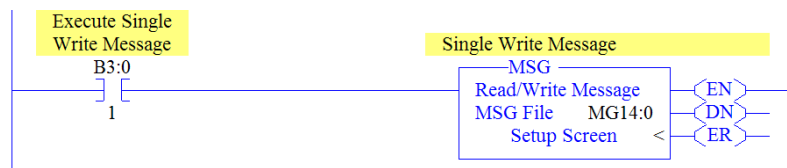


### MicroLogix 1100/1400 Example Ladder Logic Program to Write a Single Parameter Using Read/Write Parameter Service

A Write Parameter message is used to write to a single parameter. This write message example writes a value to parameter 140 - [Accel Time 1] in a PowerFlex 7-Class drive.

**Important:** Parameter Object Class code 0x0F is not supported in PowerFlex 750-Series drives. To do a single parameter write, follow the SLC 500 (Generic Attribute Service) single write example on [page 6-63](#).

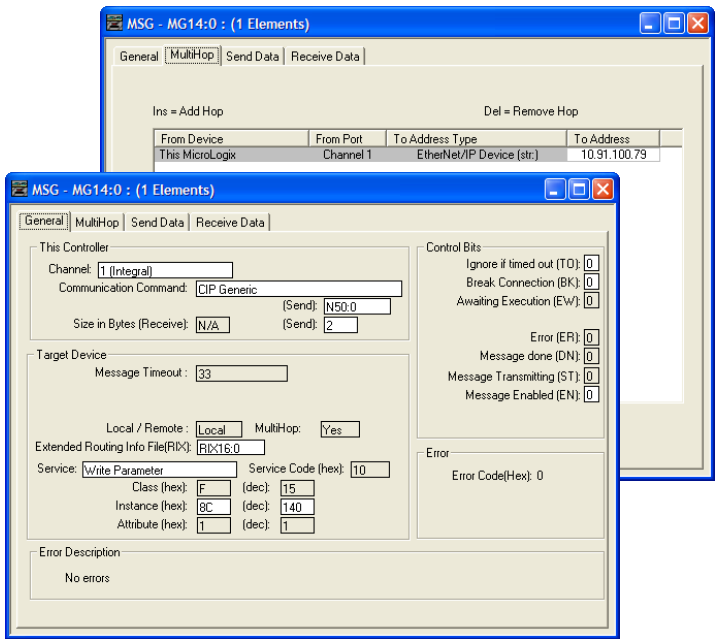
**Figure 6.70 Example Ladder Logic to Write a Single Parameter**



**Important:** If the explicit message single write must be written continuously, use DPI Parameter Object Class code 0x93 and attribute A (10 decimal; see [page 6-64](#)). This writes to RAM—not NVS (EEPROM) memory. This example single write message using Class code F writes to NVS. Over time, continuous writes will exceed the EEPROM life cycle and cause the drive to malfunction.

MicroLogix 1100/1400 – Formatting a Message to Write a Single Parameter Using Read/Write Parameter Service

Figure 6.71 Write Parameter Message Configuration Screens



The following table identifies the data that is required in each box to configure a message to write a single parameter.

| General Tab             | Example Value    | Description                                                                                                                            |
|-------------------------|------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Channel                 | 1                | Controller port to which the network is connected.                                                                                     |
| Comm... Command         | CIP Generic      | Used to access the Parameter Object in the adapter.                                                                                    |
| Data Table Address      | N50:0            | An unused controller data table address containing the message instruction. This address is the starting word of the destination file. |
| Size in Bytes           | 2 <sup>(3)</sup> | Number of bytes to be transferred. Each byte size is an 8-bit integer.                                                                 |
| Extended Routing...     | RIX16:0          | An unused routing information file for the controller.                                                                                 |
| Service <sup>(1)</sup>  | Write Parameter  | Code for the requested service.                                                                                                        |
| Instance <sup>(2)</sup> | 140 (Dec.)       | Instance number is the same as the parameter number.                                                                                   |
| MultiHop Tab            | Example Value    | Description                                                                                                                            |
| To Address              | 10.91.100.79     | IP address of the adapter connected to the drive.                                                                                      |

<sup>(1)</sup> The default setting for Service is "Custom," enabling entry of a Service Code not available from the Service pull-down menu. When choosing a Service other than "Custom" from the pull-down menu, an appropriate Hex. value is automatically assigned to the Service Code box which is dimmed (unavailable).

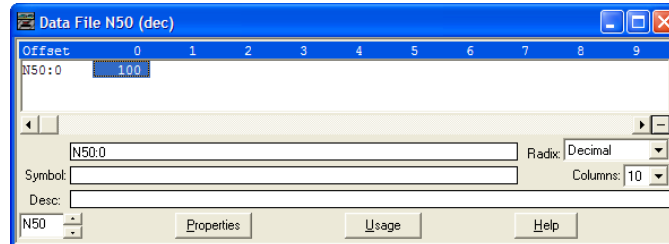
<sup>(2)</sup> Only drive parameters (Port 0) can be written to using Parameter Object Class code 0x0F. To write to a parameter of a peripheral in another port, use DPI Parameter Object Class code 0x93 (see [page 6-63](#)).

<sup>(3)</sup> In this example, Accel Time 1 is a 16-bit parameter. If the parameter being written to is a 32-bit parameter, the Size in Bytes would be set to 4. When the parameter being written to is a 32-bit REAL (floating point) data type, the size in bytes would be set to 4. See the drive documentation to determine the size of the parameter and its data type (16-bit or 32-bit integer or REAL).

### MicroLogix 1100/1400 Example Write Single Request Data

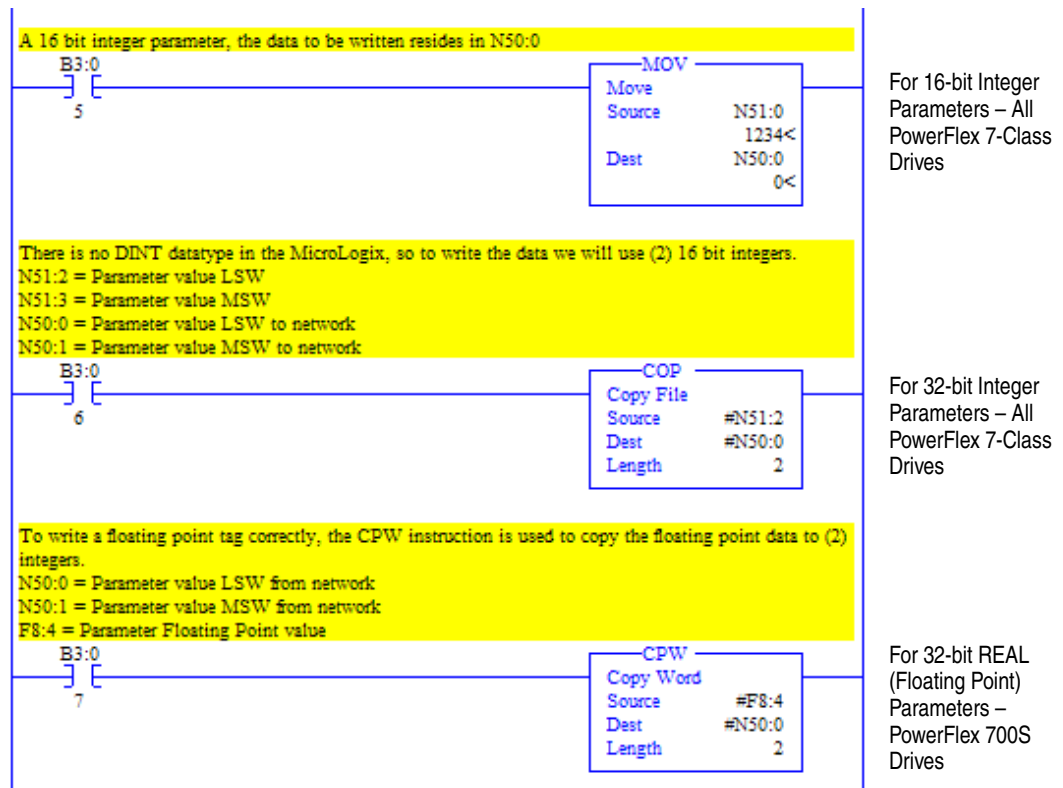
In this message example, we use the data table address in [Figure 6.72](#) to store the request value (10.0 sec.) that was written to drive parameter 140 - [Accel Time 1]. To determine the data type for the parameter and its required scaling, refer to the specific drive documentation.

**Figure 6.72 Example Write Single Request Data File**



[Figure 6.73](#) shows example ladder logic to correctly format the three possible data types for write messages in the MicroLogix 1100/1400.

**Figure 6.73 Example Ladder Logic to Format Parameter Data Types for Writes**



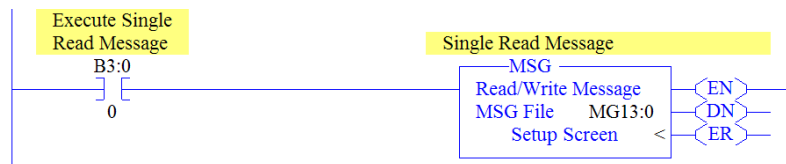
## MicroLogix 1100/1400 Explicit Messaging Using the Generic Get/Set Attribute Service

MicroLogix 1100/1400 Example Ladder Logic Program to Read a Single Parameter

A Generic Get Attribute Single message is used to read a single parameter. This read message example reads the value of parameter 003 - [Output Current] in a PowerFlex 7-Class drive.

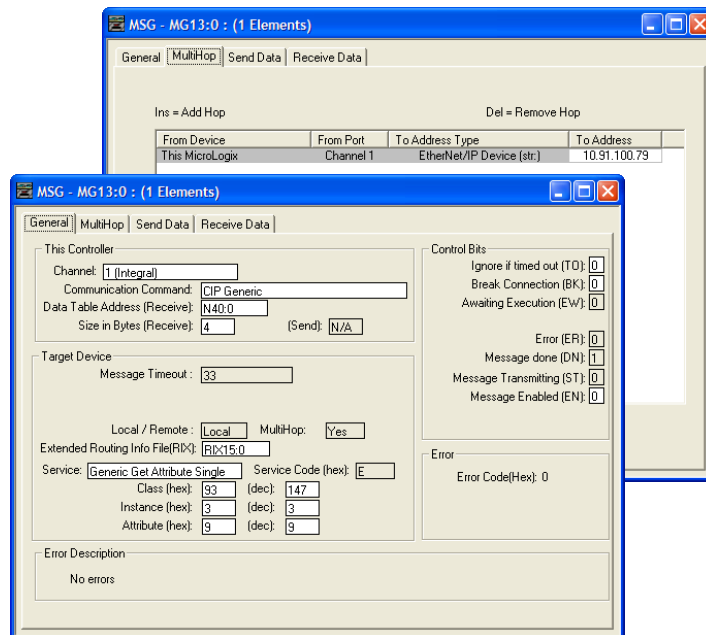
**Important:** See [Table 6.A on page 6-2](#) for limitations of PowerFlex 7-Class and PowerFlex 750-Series drives when using Class code 0x93 or Class code 0x9F for explicit messaging.

**Figure 6.74 Example Ladder Logic to Read a Single Parameter**



## MicroLogix 1100/1400 – Formatting a Message to Read a Single Parameter Using Generic Get/Set Attribute Service

**Figure 6.75 Generic Get Attribute Single Message Configuration Screens**



The following table identifies the data that is required in each box to configure a message to read a single parameter.

| General Tab             | Example Value                  | Description                                                                                                                            |
|-------------------------|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Channel                 | 1                              | Controller port to which the network is connected.                                                                                     |
| Comm... Command         | CIP Generic                    | Used to access the Parameter Object in the adapter.                                                                                    |
| Data Table Address      | N40:0                          | An unused controller data table address containing the message instruction. This address is the starting word of the destination file. |
| Size in Bytes           | 4 <sup>(3)</sup>               | Number of bytes to be transferred. Each byte size is an 8-bit integer.                                                                 |
| Extended Routing...     | R15:0                          | An unused routing information file for the controller.                                                                                 |
| Service <sup>(1)</sup>  | Generic Get Attribute Single   | Code for the requested service.                                                                                                        |
| Class                   | 93 or 9F (Hex.) <sup>(4)</sup> | Class ID for the DPI Parameter Object.                                                                                                 |
| Instance <sup>(2)</sup> | 3 (Dec.)                       | Instance number is the same as the parameter number.                                                                                   |
| Attribute               | 9 (Dec.)                       | Attribute number for the Parameter Value attribute.                                                                                    |
| MultiHop Tab            | Example Value                  | Description                                                                                                                            |
| To Address              | 10.91.100.79                   | IP address of the adapter connected to the drive.                                                                                      |

<sup>(1)</sup> The default setting for Service is "Custom," enabling entry of a Service Code not available from the Service pull-down menu. When choosing a Service other than "Custom" from the pull-down menu, an appropriate Hex. value is automatically assigned to the Service Code box which is dimmed (unavailable).

<sup>(2)</sup> The instance is the parameter number in the drive (Port 0). For example, to read parameter 4 of a peripheral in Port 5 of a PowerFlex 750-Series drive, the instance would be 21504 + 4 = 21508. See [DPI Parameter Object on page C-16](#) (Class code 0x93) or [Host DPI Parameter Object on page C-30](#) (Class code 0x9F) to determine the instance number.

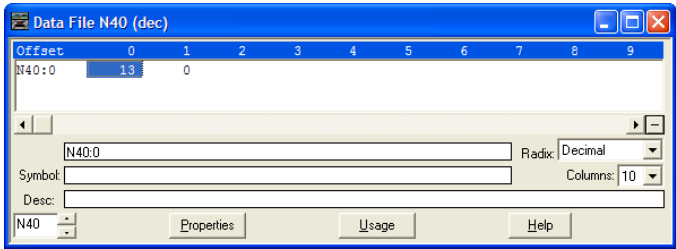
<sup>(3)</sup> In this example, Output Current is a 32-bit parameter. If the parameter being read is a 16-bit parameter, the Size in Bytes would be set to 2. When the parameter being read is a 32-bit REAL (floating point) data type, the size in bytes would be set to 4. See the drive documentation to determine the size of the parameter and its data type (16-bit or 32-bit integer or REAL).

<sup>(4)</sup> See [Table 6.A on page 6-2](#) for limitations of PowerFlex 7-Class and PowerFlex 750-Series drives when using DPI Parameter Object Class code 0x93 or Host DPI Parameter Object Class code 0x9F for explicit messaging.

MicroLogix 1100/1400 Example Get Attribute Single Response Data

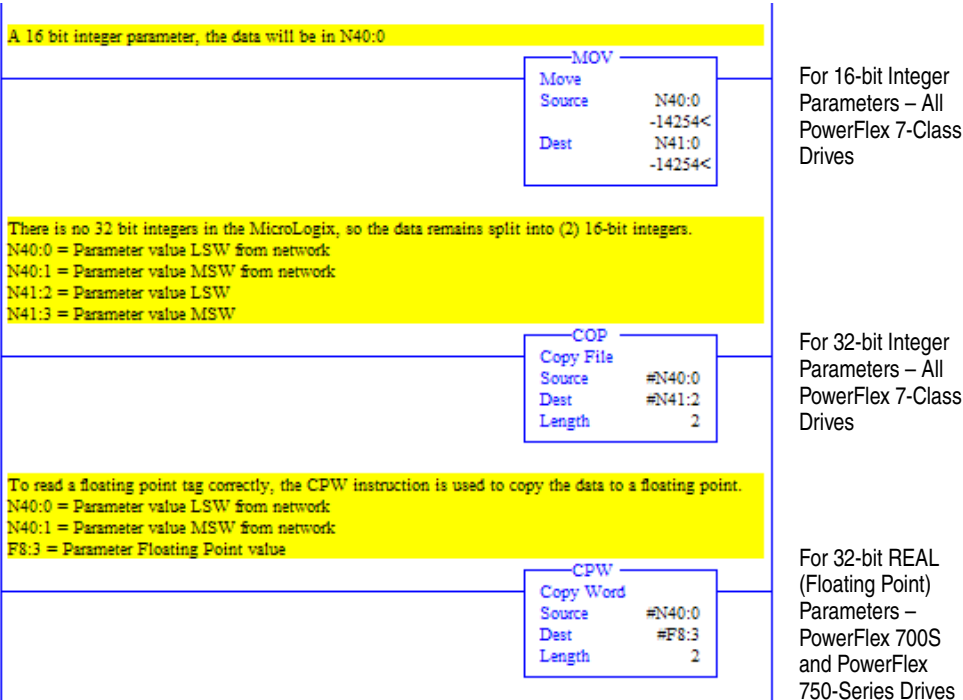
In this message example, we use the data table address in [Figure 6.76](#) to store the response value (0.13 amps) that was read from drive parameter 003 - [Output Current]. To determine the data type for the parameter and its required scaling, refer to the specific drive documentation.

Figure 6.76 Example Get Attribute Single Response Data File



[Figure 6.77](#) shows example ladder logic to correctly format the three possible data types for read messages in the MicroLogix 1100/1400.

Figure 6.77 Example Ladder Logic to Format Parameter Data Types for Gets

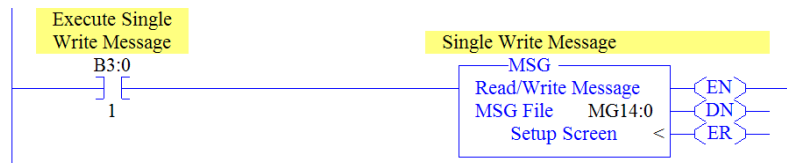


### MicroLogix 1100/1400 Example Ladder Logic Program to Write a Single Parameter Using Generic Get/Set Attribute Service

A Generic Set Attribute Single message is used to write to a single parameter. This write message example writes a value to parameter 140 - [Accel Time 1] in a PowerFlex 7-Class drive.

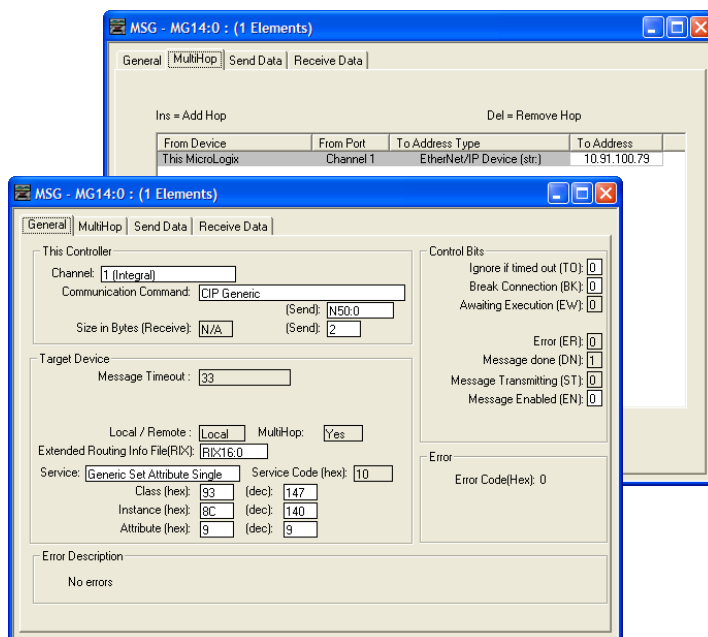
**Important:** See [Table 6.A on page 6-2](#) for limitations of PowerFlex 7-Class and PowerFlex 750-Series drives when using Class code 0x93 or Class code 0x9F for explicit messaging.

**Figure 6.78 Example Ladder Logic to Write a Single Parameter**



## MicroLogix 1100/1400 – Formatting a Message to Write a Single Parameter Using Generic Get/Set Attribute Service

**Figure 6.79 Generic Set Attribute Single Message Configuration Screens**



The following table identifies the data that is required in each box to configure a message to write a single parameter.

| General Tab              | Example Value                  | Description                                                                                                                            |
|--------------------------|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Channel                  | 1                              | Controller port to which the network is connected.                                                                                     |
| Comm... Command          | CIP Generic                    | Used to access the Parameter Object in the adapter.                                                                                    |
| Data Table Address       | N50:0                          | An unused controller data table address containing the message instruction. This address is the starting word of the destination file. |
| Size in Bytes            | 2 <sup>(4)</sup>               | Number of bytes to be transferred. Each byte size is an 8-bit integer.                                                                 |
| Extended Routing...      | R1X16:0                        | An unused routing information file for the controller.                                                                                 |
| Service <sup>(1)</sup>   | Generic Set Attribute Single   | Code for the requested service.                                                                                                        |
| Class                    | 93 or 9F (Hex.) <sup>(5)</sup> | Class ID for the DPI Parameter Object.                                                                                                 |
| Instance <sup>(2)</sup>  | 140 (Dec.)                     | Instance number is the same as the parameter number.                                                                                   |
| Attribute <sup>(3)</sup> | 9 or 10 (Dec.)                 | Attribute number for the Parameter Value attribute.                                                                                    |
| MultiHop Tab             | Example Value                  | Description                                                                                                                            |
| To Address               | 10.91.100.79                   | IP address of the adapter connected to the drive.                                                                                      |

<sup>(1)</sup> The default setting for Service is "Custom," enabling entry of a Service Code not available from the Service pull-down menu. When choosing a Service other than "Custom" from the pull-down menu, an appropriate Hex. value is automatically assigned to the Service Code box which is dimmed (unavailable).

<sup>(2)</sup> The instance is the parameter number in the drive (Port 0). For example, to write to parameter 4 of a peripheral in Port 5 of a PowerFlex 750-Series drive, the instance would be  $21504 + 4 = 21508$ . See [DPI Parameter Object on page C-16](#) (Class code 0x93) or [Host DPI Parameter Object on page C-30](#) (Class code 0x9F) to determine the instance number.

<sup>(3)</sup> Setting the Attribute value to "9" will write the parameter value to the drive's Non-Volatile Storage (EEPROM) memory, so the parameter value will remain even after the drive is power cycled. **Important:** When set to "9," be very cautious as the EEPROM may quickly exceed its life cycle and cause the drive to malfunction. Setting the Attribute value to "10" will write the parameter value to temporary memory, so the parameter value will be lost after the drive is power cycled. It is recommended to use the "10" setting when frequent write messages are required.

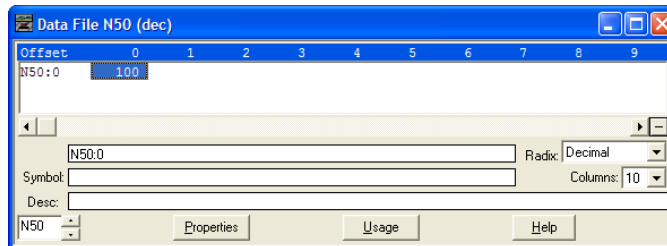
<sup>(4)</sup> In this example, Accel Time 1 is a 16-bit parameter. If the parameter being written to is a 32-bit parameter, the Size in Bytes would be set to 4.

<sup>(5)</sup> See [Table 6.A on page 6-2](#) for limitations of PowerFlex 7-Class and PowerFlex 750-Series drives when using DPI Parameter Object Class code 0x93 or Host DPI Parameter Object Class code 0x9F for explicit messaging.

### MicroLogix 1100/1400 Example Set Attribute Single Request Data

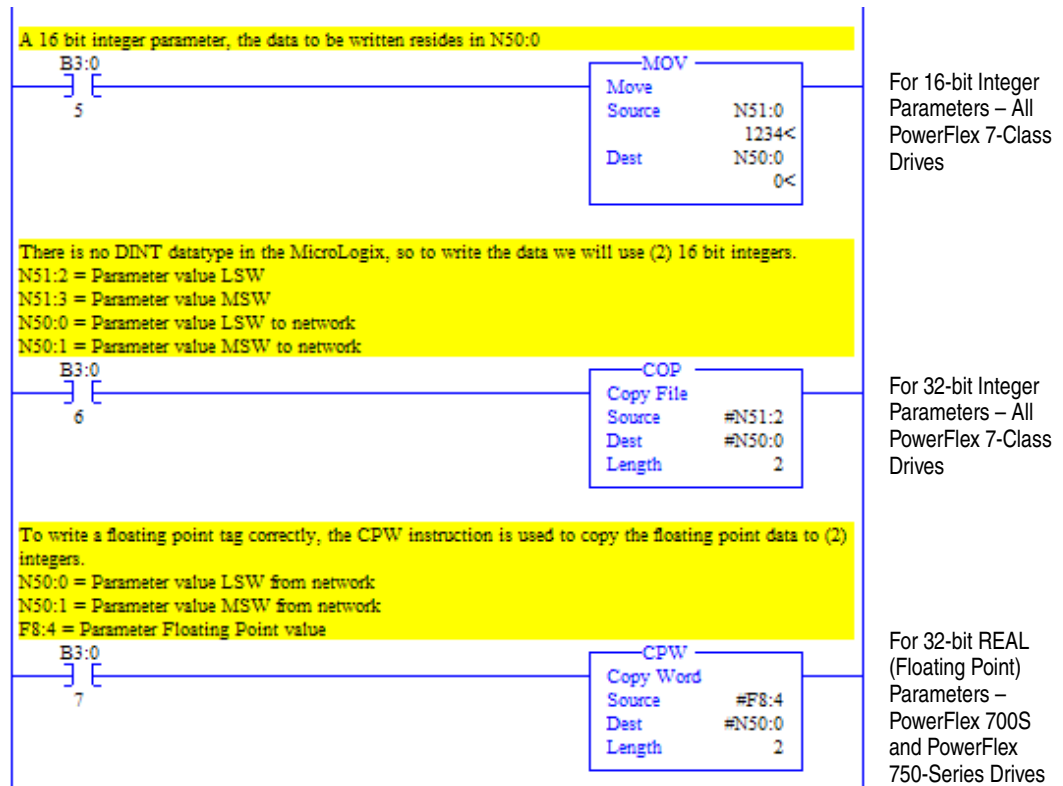
In this message example, we use the data table address in [Figure 6.80](#) to store the request value (10.0 sec.) that was written to drive parameter 140 - [Accel Time 1]. To determine the data type for the parameter and its required scaling, refer to the specific drive documentation.

**Figure 6.80 Example Set Attribute Single Request Data File**



[Figure 6.81](#) shows example ladder logic to correctly format the three possible data types for write messages in the MicroLogix 1100/1400.

**Figure 6.81 Example Ladder Logic to Format Parameter Data Types for Sets**



MicroLogix 1100/1400 Example Ladder Logic Program to Read Multiple Parameters Using Generic Get/Set Attribute Service

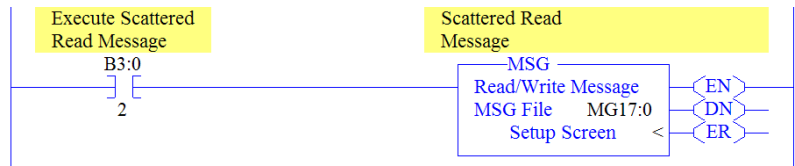
A Custom scattered read message is used to read the values of multiple parameters. This read message example reads the values of these five parameters:

| PowerFlex 7-Class Drive                                                                                                                                                                                                                                       | PowerFlex 750-Series Drive                                                                                                                                                                                                                                                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"><li>• Parameter 001 - [Output Freq]</li><li>• Parameter 003 - [Output Current]</li><li>• Parameter 006 - [Output Voltage]</li><li>• Parameter 012 - [DC Bus Voltage]</li><li>• Parameter 017 - [Analog In1 Value]</li></ul> | <ul style="list-style-type: none"><li>• Parameter 001 - [Output Freq]</li><li>• Parameter 007 - [Output Current]</li><li>• Parameter 137 - [Open Loop Fdbk]</li><li>• Parameter 21581 - [Port 5: Analog Out 0 Data]</li><li>• Parameter 260 - [Analog In0 Value]</li></ul> |

Refer to [DPI Parameter Object on page C-16](#) (Class code 0x93) or [Host DPI Parameter Object on page C-30](#) (Class code 0x9F) for parameter numbering.

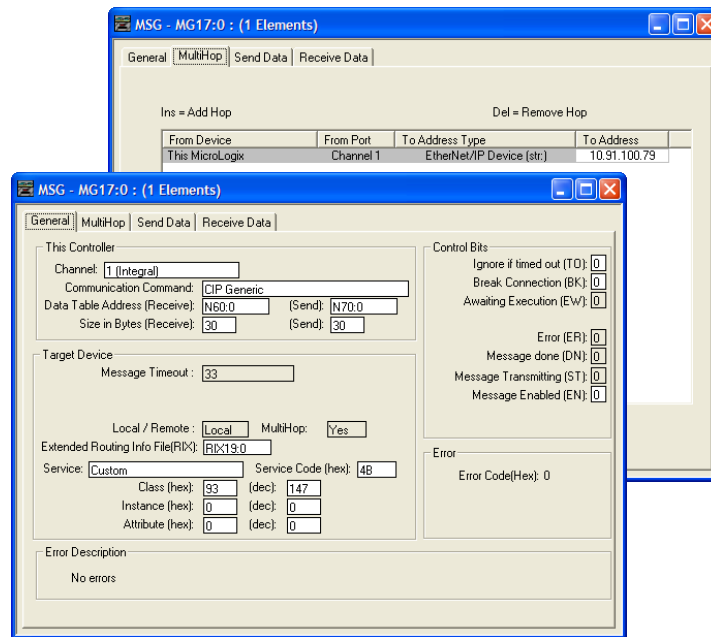
**Important:** See [Table 6.A on page 6-2](#) for limitations of PowerFlex 7-Class and PowerFlex 750-Series drives when using Class code 0x93 or Class code 0x9F for explicit messaging.

Figure 6.82 Example Ladder Logic to Read Multiple Parameters



## MicroLogix 1100/1400 – Formatting a Message to Read Multiple Parameters Using Generic Get/Set Attribute Service

**Figure 6.83 Custom Scattered Read Message Configuration Screens**



The following table identifies the data that is required in each box to configure a message to read multiple parameters.

| General Tab            | Example Value                  | Description                                                                                                                            |
|------------------------|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Channel                | 1                              | Controller port to which the network is connected.                                                                                     |
| Comm... Command        | CIP Generic                    | Used to access the Parameter Object in the adapter.                                                                                    |
| Data Table Address     | N60:0                          | An unused controller data table address containing the message instruction. This address is the starting word of the destination file. |
| Size in Bytes          | 30 <sup>(2)</sup>              | Number of bytes to be transferred. Each byte size is an 8-bit integer.                                                                 |
| Extended Routing...    | R1X19:0                        | An unused routing information file for the controller.                                                                                 |
| Service <sup>(1)</sup> | Custom                         | Required for scattered messages.                                                                                                       |
| Service Code           | 4B (Hex.)                      | Code for the requested service.                                                                                                        |
| Class                  | 93 or 9F (Hex.) <sup>(3)</sup> | Class ID for the DPI Parameter Object.                                                                                                 |
| Instance               | 0 (Dec.)                       | Required for scattered messages.                                                                                                       |
| Attribute              | 0 (Dec.)                       | Required for scattered messages.                                                                                                       |
| MultiHop Tab           | Example Value                  | Description                                                                                                                            |
| To Address             | 10.91.100.79                   | IP address of the adapter connected to the drive.                                                                                      |

<sup>(1)</sup> The default setting for Service is "Custom," enabling entry of a Service Code not available from the Service pull-down menu. When choosing a Service other than "Custom" from the pull-down menu, an appropriate Hex. value is automatically assigned to the Service Code box which is dimmed (unavailable).

<sup>(2)</sup> In this example, we are reading five parameters. Each parameter being read requires three contiguous 16-bit words. Scattered read messages always assume that every parameter being read is a 32-bit parameter, regardless of its actual size. Therefore, the Size in Bytes must be set to 30. The data structure format is the same as shown on [page 6-74](#). Maximum length is 66 words (132 bytes), which equates to 22 parameters. For parameter numbering, see [DPI Parameter Object on page C-16](#) (Class code 0x93) or [Host DPI Parameter Object on page C-30](#) (Class code 0x9F).

<sup>(3)</sup> See [Table 6.A on page 6-2](#) for limitations of PowerFlex 7-Class and PowerFlex 750-Series drives when using DPI Parameter Object Class code 0x93 or Host DPI Parameter Object Class code 0x9F for explicit messaging.

MicroLogix 1100/1400 Example Scattered Read Request Data

In this message example, we use the data table addresses in [Figure 6.84](#) or [Figure 6.85](#) to store the request values to be read from these drive parameters:

| PowerFlex 7-Class Drive                                                                                                                                                                                                                                       | PowerFlex 750-Series Drive                                                                                                                                                                                                                                                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"><li>• Parameter 001 - [Output Freq]</li><li>• Parameter 003 - [Output Current]</li><li>• Parameter 006 - [Output Voltage]</li><li>• Parameter 012 - [DC Bus Voltage]</li><li>• Parameter 017 - [Analog In1 Value]</li></ul> | <ul style="list-style-type: none"><li>• Parameter 001 - [Output Freq]</li><li>• Parameter 007 - [Output Current]</li><li>• Parameter 137 - [Open Loop Fdbk]</li><li>• Parameter 21581 - [Port 5: Analog Out 0 Data]</li><li>• Parameter 260 - [Analog In0 Value]</li></ul> |

Refer to [DPI Parameter Object on page C-16](#) (Class code 0x93) or [Host DPI Parameter Object on page C-30](#) (Class code 0x9F) for parameter numbering.

Figure 6.84 Example Scattered Read Request Data File for PowerFlex 7-Class Drive

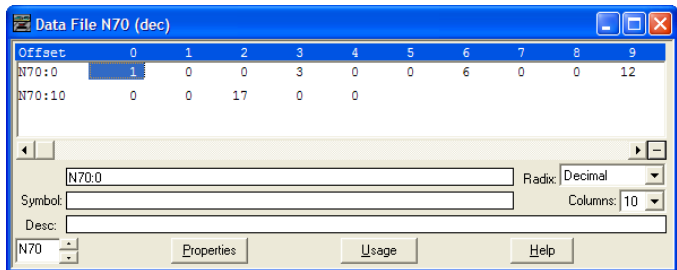
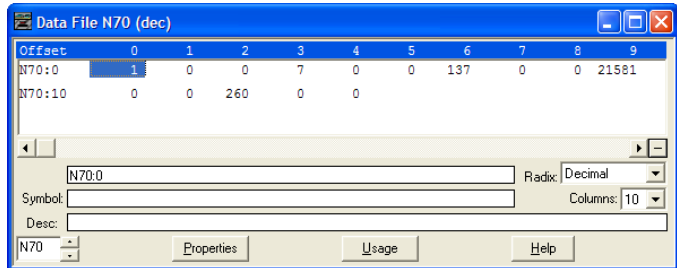


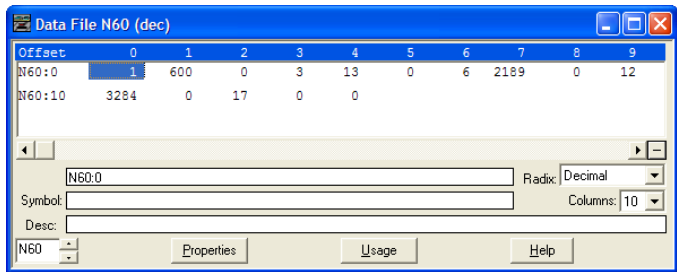
Figure 6.85 Example Scattered Read Request Data File for PowerFlex 750-Series Drive



MicroLogix 1100/1400 Example Scattered Read Response Data

In this message example, we use the data table addresses in [Figure 6.86](#) or [Figure 6.87](#) to store the response values that were read from the requested drive parameters.

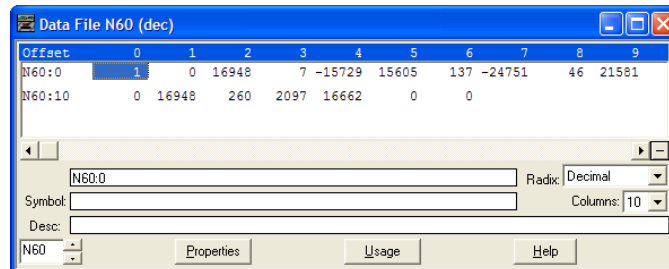
Figure 6.86 Example Scattered Read Response Data File for PowerFlex 7-Class Drive



In this example, the parameters have the following values:

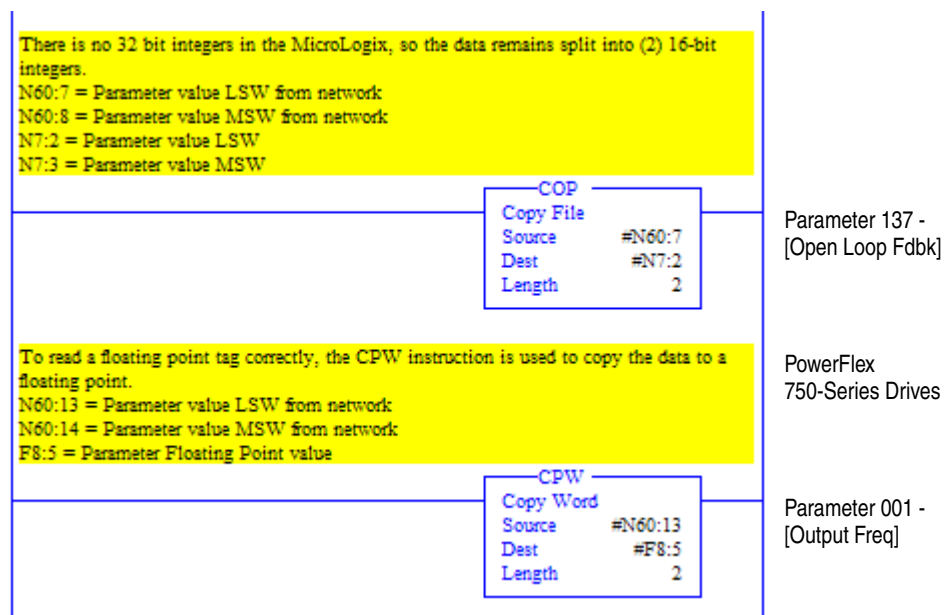
| PowerFlex 7-Class Drive Parameter | Address | Read Value |
|-----------------------------------|---------|------------|
| 1 - [Output Freq]                 | N60:1   | 32.5 Hz    |
| 3 - [Output Current]              | N60:4   | 0.01 Amp   |
| 6 - [Output Voltage]              | N60:7   | 118.7 VAC  |
| 12 - [DC Bus Voltage]             | N60:10  | 329.2 VDC  |
| 17 - [Analog In2 Value]           | N60:13  | 8.318 mA   |

**Figure 6.87 Example Scattered Read Response Data File for PowerFlex 750-Series Drive**



The PowerFlex 750-Series drive uses 32-bit integer and REAL parameters. A COP or CPW command must be used to copy the N60 integer array to a 16-bit integer or floating tag. [Figure 6.88](#) shows the ladder logic used for this example. If the parameter data type is a 32-bit integer, the data remains split into two 16-bit integers since there are no 32-bit integers in the MicroLogix 1100/1400. If the parameter data type is a REAL, then the destination tag is a floating point. See the drive documentation to determine the parameter data type (32-bit integer or REAL).

**Figure 6.88 Example Ladder Logic to Copy Response Data for PowerFlex 750-Series Drive**



In this message example, the parameters have the following values:

| PowerFlex 750-Series Drive Parameter | Read Value  | Data Type |
|--------------------------------------|-------------|-----------|
| 1 - [Output Freq]                    | 45.0 Hz     | REAL      |
| 7 - [Output Current]                 | 0.03 Amp    | REAL      |
| 137 - [Open Loop Fdbk]               | 3055441     | DINT      |
| 21581 - [Port 5: Analog Out 0 Data]  | 45.0 Hz     | REAL      |
| 260 - [Analog In0 Value]             | 9.377 Volts | REAL      |

#### MicroLogix 1100/1400 Example Ladder Logic Program to Write Multiple Parameters Using Generic Get/Set Attribute Service

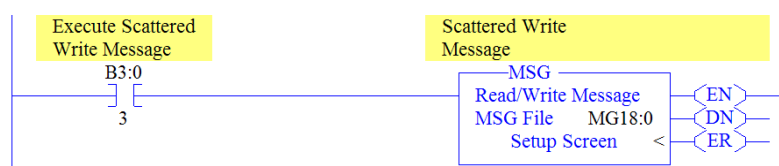
A Custom scattered write message is used to write to multiple parameters. This write message example writes the following values to these five parameters:

| PowerFlex 7-Class Drive Parameter | Write Value | PowerFlex 750-Series Drive Parameter | Write Value |
|-----------------------------------|-------------|--------------------------------------|-------------|
| 141 - [Accel Time 2]              | 11.1 Sec.   | 536 - [Accel Time 2]                 | 11.1 Sec.   |
| 143 - [Decel Time 2]              | 22.2 Sec.   | 538 - [Decel Time 2]                 | 22.2 Sec.   |
| 105 - [Preset Speed 5]            | 33.3 Hz.    | 725 - [Zero Position]                | 33          |
| 106 - [Preset Speed 6]            | 44.4 Hz.    | 21555 - [Port 5: Analog In0 Hi]      | 5.5         |
| 107 - [Preset Speed 7]            | 55.5 Hz.    | 780 - [PTP Setpoint]                 | -75,555     |

Refer to [DPI Parameter Object on page C-16](#) (Class code 0x93) or [Host DPI Parameter Object on page C-30](#) (Class code 0x9F) for parameter numbering.

**Important:** See [Table 6.A on page 6-2](#) for limitations of PowerFlex 7-Class and PowerFlex 750-Series drives when using Class code 0x93 or Class code 0x9F for explicit messaging.

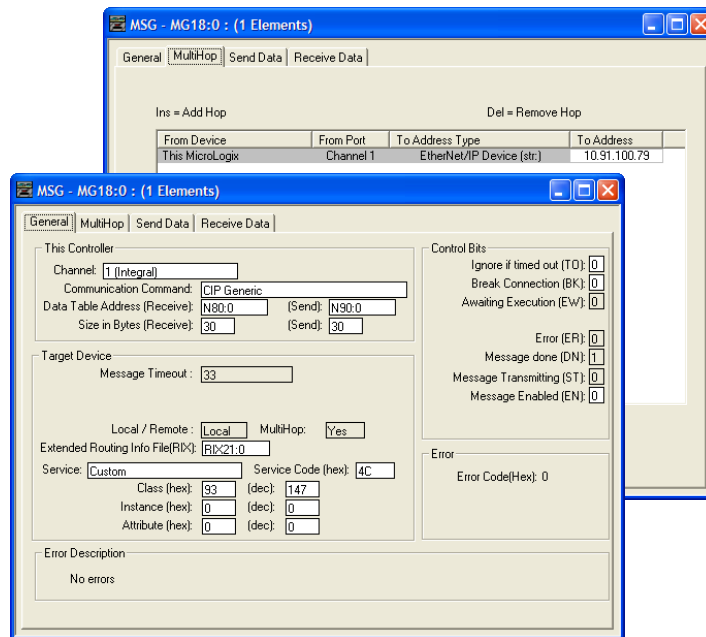
**Figure 6.89 Example Ladder Logic to Write Multiple Parameters**



**Important:** If the explicit message scattered write must be written continuously, then use a separate Generic Set service explicit message single write for each parameter using DPI Parameter Object Class code 0x93 or Host DPI Parameter Object Class code 0x9F and attribute A (10 decimal; see [page 6-64](#)). Attribute A writes to RAM—not NVS (EEPROM) memory. This example scattered write message using attribute 0 writes to NVS. Over time, continuous writes will exceed the EEPROM life cycle and cause the drive to malfunction.

## MicroLogix 1100/1400 – Formatting a Message to Write Multiple Parameters Using Generic Get/Set Attribute Service

**Figure 6.90 Custom Scattered Write Multiple Message Configuration Screens**



The following table identifies the data that is required in each box to configure a message to write multiple parameters.

| General Tab            | Example Value                  | Description                                                                                                                            |
|------------------------|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Channel                | 1                              | Controller port to which the network is connected.                                                                                     |
| Comm... Command        | CIP Generic                    | Used to access the Parameter Object in the adapter.                                                                                    |
| Data Table Address     | N80:0                          | An unused controller data table address containing the message instruction. This address is the starting word of the destination file. |
| Size in Bytes          | 30 <sup>(2)</sup>              | Number of bytes to be transferred. Each byte size is an 8-bit integer.                                                                 |
| Extended Routing...    | RIX21:0                        | An unused routing information file for the controller.                                                                                 |
| Service <sup>(1)</sup> | Custom                         | Required for scattered messages.                                                                                                       |
| Service Code           | 4C (Hex.)                      | Code for the requested service.                                                                                                        |
| Class                  | 93 or 9F (Hex.) <sup>(3)</sup> | Class ID for the DPI Parameter Object.                                                                                                 |
| Instance               | 0 (Dec.)                       | Required for scattered messages.                                                                                                       |
| Attribute              | 0 (Dec.)                       | Required for scattered messages.                                                                                                       |
| MultiHop Tab           | Example Value                  | Description                                                                                                                            |
| To Address             | 10.91.100.79                   | IP address of the adapter connected to the drive.                                                                                      |

- <sup>(1)</sup> The default setting for Service is "Custom," enabling entry of a Service Code not available from the Service pull-down menu. When choosing a Service other than "Custom" from the pull-down menu, an appropriate Hex. value is automatically assigned to the Service Code box which is dimmed (unavailable).
- <sup>(2)</sup> In this example, we are writing to five parameters. Each parameter being written to requires three contiguous 16-bit words. Scattered write messages always assume that every parameter being written to is a 32-bit parameter, regardless of its actual size. Therefore, the Size in Bytes must be set to 30. The data structure format is the same as shown on [page 6-18](#). Maximum length is 66 words (132 bytes), which equates to 22 parameters. For parameter numbering, see [DPI Parameter Object on page C-16](#) (Class code 0x93) or [Host DPI Parameter Object on page C-30](#) (Class code 0x9F).
- <sup>(3)</sup> See [Table 6.A on page 6-2](#) for limitations of PowerFlex 7-Class and PowerFlex 750-Series drives when using DPI Parameter Object Class code 0x93 or Host DPI Parameter Object Class code 0x9F for explicit messaging.

MicroLogix 1100/1400 Example Scattered Write Request Data

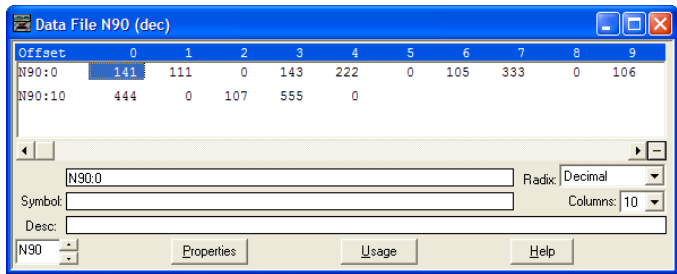
In this message example, we use the data table addresses in [Figure 6.91](#) to store the request values to be written to these drive parameters:

| PowerFlex 7-Class Drive Parameter | Address | Write Value | PowerFlex 750-Series Drive Parameter | Write Value | Data Type      |
|-----------------------------------|---------|-------------|--------------------------------------|-------------|----------------|
| 141 - [Accel Time 2]              | N90:1   | 11.1 Sec.   | 536 - [Accel Time 2]                 | 11.1 Sec.   | REAL           |
| 143 - [Decel Time 2]              | N90:4   | 22.2 Sec.   | 538 - [Decel Time 2]                 | 22.2 Sec.   | REAL           |
| 105 - [Preset Speed 5]            | N90:7   | 33.3 Hz.    | 725 - [Zero Position]                | 33          | 32-bit integer |
| 106 - [Preset Speed 6]            | N90:10  | 44.4 Hz.    | 21555 - [Port 5: Analog In0 Hi]      | 5.5         | REAL           |
| 107 - [Preset Speed 7]            | N90:13  | 55.5 Hz.    | 780 - [PTP Setpoint]                 | -75,555     | 32-bit integer |

Refer to [DPI Parameter Object on page C-16](#) (Class code 0x93) or [Host DPI Parameter Object on page C-30](#) (Class code 0x9F) for parameter numbering.

[Figure 6.91](#) or [Figure 6.94](#) shows the parameter values.

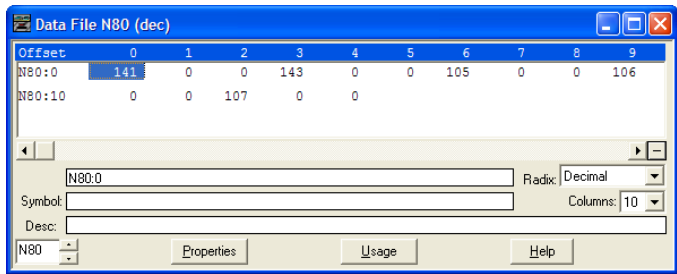
Figure 6.91 Example Scattered Write Request Data File for PowerFlex 7-Class Drive



MicroLogix 1100/1400 Example Scattered Write Response Data

In this message example, we use the data table addresses in [Figure 6.92](#) to store the response values that were written to the requested drive parameters. Values of "0" indicate no errors occurred.

Figure 6.92 Example Scattered Write Response Data File for PowerFlex 7-Class Drive



The PowerFlex 750-Series drive uses 32-bit integer and REAL parameters. A COP or CPW command must be used to copy the 16-bit integer or REAL values to the N90 integer array. [Figure 6.93](#) shows the ladder logic used for this example. If the parameter data type is a 32-bit integer, the data remains

split into two 16-bit integers since there are no 32-bit integers in the MicroLogix 1100/1400. If the parameter data type is a REAL, then the source tag is a floating point. See the drive documentation to determine the parameter data type (32-bit integer or REAL).

**Figure 6.93 Example Ladder Logic to Copy Request Data for PowerFlex 750-Series Drive**

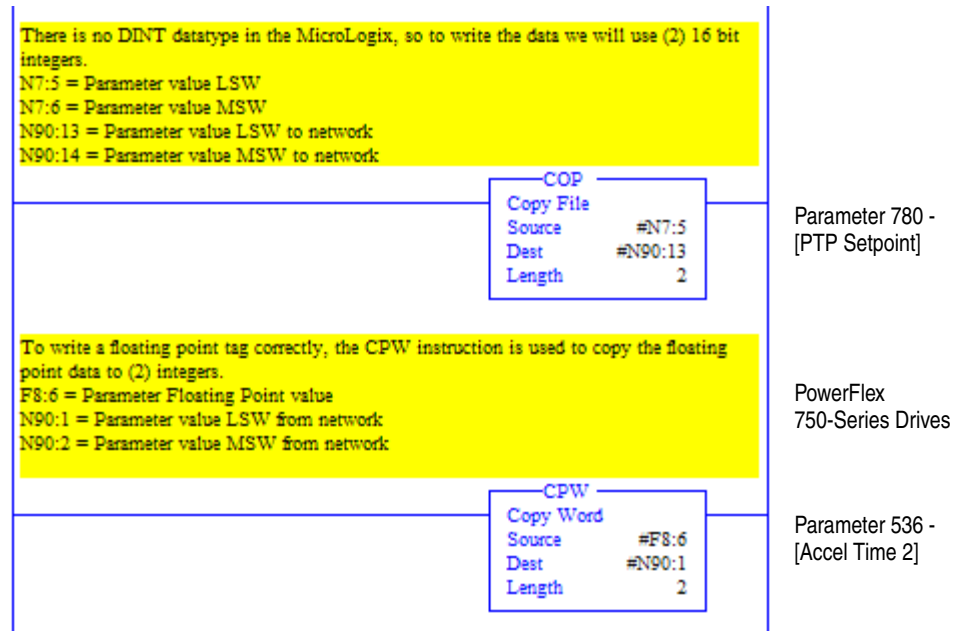


**Figure 6.94 Example Scattered Write Request Data File for PowerFlex 750-Series Drive**

| Data File N90 (dec) |     |        |       |        |        |       |     |    |   |       |
|---------------------|-----|--------|-------|--------|--------|-------|-----|----|---|-------|
| Offset              | 0   | 1      | 2     | 3      | 4      | 5     | 6   | 7  | 8 | 9     |
| N90:0               | 536 | -26214 | 16689 | 538    | -26214 | 16817 | 725 | 33 | 0 | 21555 |
| N90:10              | 0   | 16560  | 780   | -10019 | -2     |       |     |    |   |       |

N90:0  
 Symbol: \_\_\_\_\_  
 Desc: \_\_\_\_\_  
 Radius: Decimal  
 Columns: 10

N90  
 Properties Usage Help

The results of the explicit message appear in the destination tag array N80 (Figure 6.63). Values of “0” indicate no errors occurred.

**Figure 6.95 Example Scattered Write Response Data File for PowerFlex 750-Series Drive**

| Data File N80 (dec) |     |   |     |     |   |   |     |   |   |       |
|---------------------|-----|---|-----|-----|---|---|-----|---|---|-------|
| Offset              | 0   | 1 | 2   | 3   | 4 | 5 | 6   | 7 | 8 | 9     |
| N80:0               | 536 | 0 | 0   | 538 | 0 | 0 | 725 | 0 | 0 | 21555 |
| N80:10              | 0   | 0 | 780 | 0   | 0 |   |     |   |   |       |

N80:0  
 Symbol: \_\_\_\_\_  
 Desc: \_\_\_\_\_  
 Radius: Decimal  
 Columns: 10

N80  
 Properties Usage Help

### MicroLogix 1100/1400 – Explanation of Request and Response Data for Read/Write Multiple Messaging

The data structures in [Figure 6.96](#) and [Figure 6.97](#) use 16-bit words and can accommodate up to 22 parameters in a single message. In the Response Message, a parameter number with the high bit set indicates that the associated parameter value field contains an error code (parameter number in response data will be negative).

**Important:** See [Table 6.A on page 6-2](#) for limitations of PowerFlex 7-Class and PowerFlex 750-Series drives when using Class code 0x93 or Class code 0x9F for explicit messaging.

**Figure 6.96 Data Structures for Scattered Read Messages**

| Request (Source Data) |                  | Response (Destination Data) |                     |
|-----------------------|------------------|-----------------------------|---------------------|
| Word 0                | Parameter Number | Word 0                      | Parameter Number    |
| 1                     | Pad Word         | 1                           | Parameter Value LSW |
| 2                     | Pad Word         | 2                           | Parameter Value MSW |
| 3                     | Parameter Number | 3                           | Parameter Number    |
| 4                     | Pad Word         | 4                           | Parameter Value LSW |
| 5                     | Pad Word         | 5                           | Parameter Value MSW |
| 6                     | Parameter Number | 6                           | Parameter Number    |
| 7                     | Pad Word         | 7                           | Parameter Value LSW |
| 8                     | Pad Word         | 8                           | Parameter Value MSW |
| 9                     | Parameter Number | 9                           | Parameter Number    |
| 10                    | Pad Word         | 10                          | Parameter Value LSW |
| 11                    | Pad Word         | 11                          | Parameter Value MSW |
| 12                    | Parameter Number | 12                          | Parameter Number    |
| 13                    | Pad Word         | 13                          | Parameter Value LSW |
| 14                    | Pad Word         | 14                          | Parameter Value MSW |
| ⋮                     |                  | ⋮                           |                     |
| 63                    | Parameter Number | 63                          | Parameter Number    |
| 64                    | Pad Word         | 64                          | Parameter Value LSW |
| 65                    | Pad Word         | 65                          | Parameter Value MSW |

**Figure 6.97 Data Structures for Scattered Write Messages**

| Request (Source Data) |                     | Response (Destination Data) |                  |
|-----------------------|---------------------|-----------------------------|------------------|
| Word 0                | Parameter Number    | Word 0                      | Parameter Number |
| 1                     | Parameter Value LSW | 1                           | Pad Word         |
| 2                     | Parameter Value MSW | 2                           | Pad Word         |
| 3                     | Parameter Number    | 3                           | Parameter Number |
| 4                     | Parameter Value LSW | 4                           | Pad Word         |
| 5                     | Parameter Value MSW | 5                           | Pad Word         |
| 6                     | Parameter Number    | 6                           | Parameter Number |
| 7                     | Parameter Value LSW | 7                           | Pad Word         |
| 8                     | Parameter Value MSW | 8                           | Pad Word         |
| 9                     | Parameter Number    | 9                           | Parameter Number |
| 10                    | Parameter Value LSW | 10                          | Pad Word         |
| 11                    | Parameter Value MSW | 11                          | Pad Word         |
| 12                    | Parameter Number    | 12                          | Parameter Number |
| 13                    | Parameter Value LSW | 13                          | Pad Word         |
| 14                    | Parameter Value MSW | 14                          | Pad Word         |
| ⋮                     |                     | ⋮                           |                  |
| 63                    | Parameter Number    | 63                          | Parameter Number |
| 64                    | Parameter Value LSW | 64                          | Pad Word         |
| 65                    | Parameter Value MSW | 65                          | Pad Word         |

## Troubleshooting

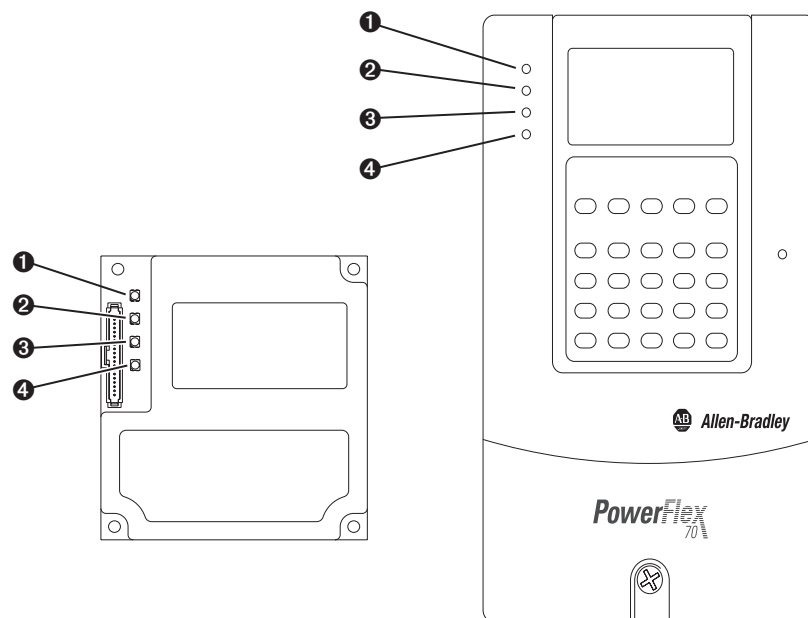
This chapter provides information for diagnosing and troubleshooting potential problems with the adapter and network.

| Topic                                               | Page                |
|-----------------------------------------------------|---------------------|
| <a href="#">Understanding the Status Indicators</a> | <a href="#">7-1</a> |
| <a href="#">PORT Status Indicator</a>               | <a href="#">7-2</a> |
| <a href="#">MOD Status Indicator</a>                | <a href="#">7-2</a> |
| <a href="#">NET A Status Indicator</a>              | <a href="#">7-3</a> |
| <a href="#">NET B Status Indicator</a>              | <a href="#">7-3</a> |
| <a href="#">Viewing Adapter Diagnostic Items</a>    | <a href="#">7-4</a> |
| <a href="#">Viewing and Clearing Events</a>         | <a href="#">7-6</a> |

### Understanding the Status Indicators

The adapter has four status indicators. They can be viewed on the adapter or through the drive cover. See [Figure 7.1](#).

**Figure 7.1** Status Indicators (location on drive may vary)



| Item | Status Indicator | Description                   | Page                |
|------|------------------|-------------------------------|---------------------|
| ①    | PORT             | DPI Connection Status         | <a href="#">7-2</a> |
| ②    | MOD              | Adapter Status                | <a href="#">7-2</a> |
| ③    | NET A            | EtherNet/IP Connection Status | <a href="#">7-3</a> |
| ④    | NET B            | EtherNet/IP Transmit Status   | <a href="#">7-3</a> |

**PORT Status Indicator**

This red/green bicolor LED indicates the status of the adapter's connection to the drive as shown in the table below.

| Status         | Cause                                                                                                                                     | Corrective Action                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Off            | The adapter is not powered or is not properly connected to the drive.                                                                     | <ul style="list-style-type: none"> <li>Securely connect the adapter to the drive using the Internal Interface (ribbon) cable.</li> <li>Apply power to the drive (or adapter if mounted in a DPI External Comms Kit).</li> </ul>                                                                                                                                                                                                                                                   |
| Flashing Red   | The adapter is not receiving a ping message from the drive.                                                                               | <ul style="list-style-type: none"> <li>Verify that cables are securely connected and not damaged. Replace cables if necessary.</li> <li>Cycle power to the drive (or adapter if mounted in a DPI External Comms Kit).</li> </ul>                                                                                                                                                                                                                                                  |
| Steady Red     | <p>The drive has refused an I/O connection from the adapter.</p> <p>Another DPI peripheral is using the same DPI port as the adapter.</p> | <p><b>Important:</b> Cycle power to the drive (or adapter if mounted in a DPI External Comms Kit) after making any of the following corrections:</p> <ul style="list-style-type: none"> <li>Verify that all DPI cables on the drive are securely connected and not damaged. Replace cables if necessary.</li> <li>Verify that the DPI drive supports Datalinks.</li> <li>Configure the adapter to use a Datalink that is not already being used by another peripheral.</li> </ul> |
| Steady Orange  | The adapter is connected to a product that does not support Allen-Bradley DPI communications.                                             | Connect the adapter to a product that supports Allen-Bradley DPI communications (for example, a PowerFlex 7-Class drive).                                                                                                                                                                                                                                                                                                                                                         |
| Flashing Green | The adapter is establishing an I/O connection to the drive.                                                                               | No action required. Normal behavior if no DPI I/O is enabled.                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Steady Green   | The adapter is properly connected and is communicating with the drive.                                                                    | No action required.                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

**MOD Status Indicator**

This red/green bicolor LED indicates the status of the adapter as shown in the table below.

| Status         | Cause                                                                                        | Corrective Action                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----------------|----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Off            | The adapter is not powered or is not properly connected to the drive.                        | <ul style="list-style-type: none"> <li>Securely connect the adapter to the drive using the Internal Interface (ribbon) cable.</li> <li>Apply power to the drive (or adapter if mounted in a DPI External Comms Kit).</li> </ul>                                                                                                                                                                                                                    |
| Flashing Red   | <p>The adapter has failed the firmware test.</p> <p>The adapter is being flash upgraded.</p> | <ul style="list-style-type: none"> <li>Clear faults in the adapter.</li> <li>Cycle power to the drive (or adapter if mounted in a DPI External Comms Kit).</li> <li>If cycling power does not correct the problem, the adapter parameter settings may have been corrupted. Reset defaults and reconfigure the adapter.</li> <li>If resetting defaults does not correct the problem, flash the adapter with the latest firmware release.</li> </ul> |
| Steady Red     | The adapter has failed the hardware test.                                                    | <ul style="list-style-type: none"> <li>Cycle power to the drive (or adapter if mounted in a DPI External Comms Kit).</li> <li>Replace the adapter.</li> </ul>                                                                                                                                                                                                                                                                                      |
| Flashing Green | The adapter is operational, but is not transferring I/O data to a controller.                | <ul style="list-style-type: none"> <li>Place the scanner in RUN mode.</li> <li>Program the controller to recognize and transmit I/O to the adapter.</li> <li>Configure the adapter for the program in the controller.</li> <li>Normal behavior if no DPI I/O is enabled.</li> </ul>                                                                                                                                                                |
| Steady Green   | The adapter is operational and transferring I/O data to a controller.                        | No action required.                                                                                                                                                                                                                                                                                                                                                                                                                                |

**NET A Status Indicator**

This red/green bicolor LED indicates the status of the network connection as shown in the table below.

| Status             | Cause                                                                                                                                   | Corrective Actions                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Off                | The adapter is not powered, the adapter is not properly connected to the network, the adapter needs an IP address, or BOOTP is enabled. | <ul style="list-style-type: none"> <li>Securely connect the adapter to the drive using the Internal Interface (ribbon) cable and to the network using an Ethernet cable.</li> <li>Correctly connect the Ethernet cable to the Ethernet connector.</li> <li>Set a unique IP address and disable BOOTP using a BOOTP server, or set a unique IP address by using adapter parameters.</li> <li>Apply power to the drive (or adapter if mounted in a DPI External Comms Kit).</li> </ul> |
| Steady Red         | The adapter failed the duplicate IP address detection test.                                                                             | Configure the adapter to use a unique IP address and cycle power.                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Flashing Red       | An EtherNet/IP connection has timed out.                                                                                                | <ul style="list-style-type: none"> <li>Place the scanner in RUN mode, or apply power to the peer device that will send I/O.</li> <li>Check the IGMP Snooping/Ethernet Switches for correct operation.</li> <li>Check the amount of traffic on the network.</li> </ul>                                                                                                                                                                                                                |
| Flashing Red/Green | The adapter is performing a self-test.                                                                                                  | No action required.                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Flashing Green     | The adapter is properly connected, has an IP address, and is connected to an EtherNet/IP network but does not have an I/O connection.   | <ul style="list-style-type: none"> <li>Place the controller in RUN mode, or apply power to the peer device that will send I/O.</li> <li>Program the controller or peer device to recognize and transmit I/O or make a messaging connection to the adapter.</li> <li>Configure the adapter for the program in the controller or the I/O from the peer device.</li> </ul>                                                                                                              |
| Steady Green       | The adapter is properly connected and communicating on the network to a controller.                                                     | No action required.                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

**NET B Status Indicator**

This green LED indicates the status of the adapter transmitting on the network as shown in the table below.

| Status         | Cause                                                                                                             | Corrective Actions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------|-------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Off            | The adapter is not powered or is not transmitting on the network.                                                 | <p>If NET A indicator is off:</p> <ul style="list-style-type: none"> <li>Securely connect the adapter to the drive using the Internal Interface (ribbon) cable and to the network using an Ethernet cable.</li> <li>Correctly connect the Ethernet cable to the Ethernet connector.</li> <li>Set a unique IP address using a BOOTP server or by disabling BOOTP and using adapter parameters.</li> </ul> <p>If NET A indicator is steady red:</p> <ul style="list-style-type: none"> <li>Configure the adapter to use a unique IP address and cycle power.</li> </ul> <p>If NET A indicator is flashing red/green or red:</p> <ul style="list-style-type: none"> <li>Check the IP address in the adapter and scanner, and verify that the controller can communicate with the adapter.</li> <li>Ping the adapter.</li> </ul> <p>Normal condition if the adapter is idle.</p> |
| Flashing Green | The adapter is properly connected, BOOTP is enabled, and the adapter is transmitting data packets on the network. | No action required.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

## Viewing Adapter Diagnostic Items

If you encounter unexpected communications problems, the adapter's diagnostic items may help you or Rockwell Automation personnel troubleshoot the problem. Adapter diagnostic items can be viewed using an LCD PowerFlex 7-Class HIM (Diagnostics/Device Items), DriveExplorer software (version 2.01 or later), or DriveExecutive software (version 3.01 or later).

### Using the HIM to View Adapter Diagnostic Items

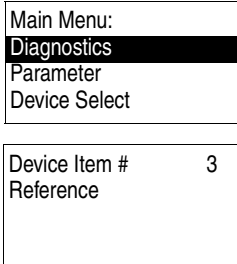
| Step                                                                                                                                                                                                                      | Example Screen                                                                      |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 1. Access parameters in the adapter. Refer to <a href="#">Using the PowerFlex 7-Class HIM on page 3-2</a> .                                                                                                               |  |
| 2. Press the  or  key to scroll to <b>Diagnostics</b> . |                                                                                     |
| 3. Press the  (Enter) key to display the Diagnostics menu in the adapter.                                                                |                                                                                     |
| 4. Repeat steps 2 and 3 to enter the <b>Device Items</b> option.                                                                                                                                                          |                                                                                     |
| 5. Press the  or  key to scroll through the items.      |                                                                                     |

**Table 7.A Adapter Diagnostic Items**

| No. | Name             | Description                                                                                                                                                                                                                                                                                 |
|-----|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | Common Logic Cmd | The present value of the Common Logic Command being transmitted to the drive by this adapter.                                                                                                                                                                                               |
| 2   | Prod Logic Cmd   | The present value of the Product Logic Command being transmitted to the drive by this adapter from the controller.                                                                                                                                                                          |
| 3   | Reference        | The present value of the Reference being transmitted to the drive by this adapter. Note that a 16-bit value will be sent as the Most Significant Word of the 32-bit field.                                                                                                                  |
| 4   | Common Logic Sts | The present value of the Common Logic Status being received from the drive by this adapter.                                                                                                                                                                                                 |
| 5   | Prod Logic Sts   | The present value of the Product Logic Status being received from the drive by this adapter to the controller.                                                                                                                                                                              |
| 6   | Feedback         | The present value of the Feedback being received from the drive by this adapter. Note that a 16-bit value will be sent as the Most Significant Word of the 32-bit field.                                                                                                                    |
| 7   | Datalink A1 In   | The present value of respective Datalink In being transmitted to the drive by this adapter. (If not using a Datalink, this parameter should have a value of zero.)                                                                                                                          |
| 8   | Datalink A2 In   |                                                                                                                                                                                                                                                                                             |
| 9   | Datalink B1 In   |                                                                                                                                                                                                                                                                                             |
| 10  | Datalink B2 In   |                                                                                                                                                                                                                                                                                             |
| 11  | Datalink C1 In   |                                                                                                                                                                                                                                                                                             |
| 12  | Datalink C2 In   |                                                                                                                                                                                                                                                                                             |
| 13  | Datalink D1 In   |                                                                                                                                                                                                                                                                                             |
| 14  | Datalink D2 In   |                                                                                                                                                                                                                                                                                             |
| 15  | Datalink A1 Out  | The present value of respective Datalink Out being received from the drive by this adapter. (If the drive indicates a 16-bit datalink size, the value appears in the least significant 16 bits of this diagnostic item, and the most significant 16 bits of this diagnostic item are zero.) |
| 16  | Datalink A2 Out  |                                                                                                                                                                                                                                                                                             |
| 17  | Datalink B1 Out  |                                                                                                                                                                                                                                                                                             |
| 18  | Datalink B2 Out  |                                                                                                                                                                                                                                                                                             |
| 19  | Datalink C1 Out  |                                                                                                                                                                                                                                                                                             |
| 20  | Datalink C2 Out  |                                                                                                                                                                                                                                                                                             |
| 21  | Datalink D1 Out  |                                                                                                                                                                                                                                                                                             |
| 22  | Datalink D2 Out  |                                                                                                                                                                                                                                                                                             |
| 23  | DPI Rx Errors    | The present value of the DPI Receive error counter.                                                                                                                                                                                                                                         |
| 24  | DPI Rx Error Max | The maximum value (since reset) of the DPI Receive error counter.                                                                                                                                                                                                                           |
| 25  | DPI Tx Errors    | The present value of the DPI Transmit error counter.                                                                                                                                                                                                                                        |

**Table 7.A Adapter Diagnostic Items (Continued)**

| No. | Name             | Description                                                                                                                                                                                                                                     |
|-----|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 26  | DPI Tx Error Max | The maximum value (since reset) of the DPI Transmit error counter.                                                                                                                                                                              |
| 27  | Boot Flash Count | Number of times the boot firmware in the adapter has been flash updated.                                                                                                                                                                        |
| 28  | App Flash Count  | Number of times the application firmware in the adapter has been flash updated.                                                                                                                                                                 |
| 29  | M-S Input Size   | Size of data transferred from the network to the drive.                                                                                                                                                                                         |
| 30  | M-S Output Size  | Size of data transferred from the drive to the network.                                                                                                                                                                                         |
| 31  | HW Addr 1        | Decimal value of each byte in the adapter's Ethernet hardware address.<br>255 : 255 : 255 : 255 : 255 : 255<br>[HW Addr 1]   [HW Addr 2]   [HW Addr 3]   [HW Addr 4]   HW Addr 5   [HW Addr 6]                                                  |
| 32  | HW Addr 2        |                                                                                                                                                                                                                                                 |
| 33  | HW Addr 3        |                                                                                                                                                                                                                                                 |
| 34  | HW Addr 4        |                                                                                                                                                                                                                                                 |
| 35  | HW Addr 5        |                                                                                                                                                                                                                                                 |
| 36  | HW Addr 6        |                                                                                                                                                                                                                                                 |
| 37  | IP Addr Act 1    | Value of each byte in the adapter's present IP address. A value of "0" appears if the adapter does not currently have an IP address.<br>255 . 255 . 255 . 255<br>[IP Addr Act 1]   [IP Addr Act 2]   [IP Addr Act 3]   [IP Addr Act 4]          |
| 38  | IP Addr Act 2    |                                                                                                                                                                                                                                                 |
| 39  | IP Addr Act 3    |                                                                                                                                                                                                                                                 |
| 40  | IP Addr Act 4    |                                                                                                                                                                                                                                                 |
| 41  | Subnet Act 1     | Value of each byte in the adapter's present subnet mask. A value of "0" appears if the adapter does not currently have a subnet mask.<br>255 . 255 . 255 . 255<br>[Subnet Act 1]   [Subnet Act 2]   [Subnet Act 3]   [Subnet Act 4]             |
| 42  | Subnet Act 2     |                                                                                                                                                                                                                                                 |
| 43  | Subnet Act 3     |                                                                                                                                                                                                                                                 |
| 44  | Subnet Act 4     |                                                                                                                                                                                                                                                 |
| 45  | Gateway Act 1    | Value of each byte in the adapter's present gateway address. A value of "0" appears if the adapter does not currently have a gateway address.<br>255 . 255 . 255 . 255<br>[Gateway Act 1]   [Gateway Act 2]   [Gateway Act 3]   [Gateway Act 4] |
| 46  | Gateway Act 2    |                                                                                                                                                                                                                                                 |
| 47  | Gateway Act 3    |                                                                                                                                                                                                                                                 |
| 48  | Gateway Act 4    |                                                                                                                                                                                                                                                 |
| 49  | EN Rx Overruns   | Number of receive buffer overruns reported by the Ethernet hardware.                                                                                                                                                                            |
| 50  | EN Rx Packets    | Number of Ethernet packets that the adapter has received.                                                                                                                                                                                       |
| 51  | EN Rx Errors     | Number of receive errors reported by the Ethernet hardware.                                                                                                                                                                                     |
| 52  | EN Tx Packets    | Number of Ethernet packets that the adapter has sent.                                                                                                                                                                                           |
| 53  | EN Tx Errors     | Number of transmit errors reported by the Ethernet hardware.                                                                                                                                                                                    |
| 54  | Last TCP Reset   | Last reason that the adapter reset or rejected a TCP/IP connection.                                                                                                                                                                             |
| 55  | Missed IO Pkts   | Number of incoming I/O connection packets that the adapter did not receive.                                                                                                                                                                     |
| 56  | OPT Status       | Operating status of optional I/O board in DPI External Comms Kit. For the meanings of the individual bits, see <a href="#">Viewing Optional I/O Diagnostic Items on page 9-4</a> .                                                              |
| 57  | OPT RX Errors    | Number of optional I/O board receive errors.                                                                                                                                                                                                    |
| 58  | OPT FW Version   | Firmware version of optional I/O board (in DPI External Comms Kit).                                                                                                                                                                             |

Viewing and Clearing Events

The adapter has an event queue to record significant events that occur in the operation of the adapter. When such an event occurs, an entry is put into the event queue. You can view the event queue using an LCD PowerFlex 7-Class HIM, DriveExplorer (version 2.01 or later) software, DriveExecutive (version 1.01 or later) software or other clients using the DPI Fault object.

The event queue can contain up to 32 entries. Eventually the event queue will become full, since its contents are retained through adapter resets. At that point, a new entry replaces the oldest entry. Only an event queue clear operation or adapter power cycle will clear the event queue contents.

Resetting the adapter to defaults has no effect on the event queue.

Using the HIM to View and Clear Events

| Step                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Example Screen                                                                                                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| <b>Viewing Events</b><br><br>1. Access parameters in the adapter. Refer to <a href="#">Using the PowerFlex 7-Class HIM on page 3-2</a> .<br><br>2. Press the ▲ or ▼ key to scroll to <b>Diagnostics</b> .<br><br>3. Press the ↵ (Enter) key to display the Diagnostics menu in the adapter.<br><br>4. Repeat steps 2 and 3 to enter the <b>Events</b> option and then <b>View Event Queue</b> option.<br><br>5. Press the ▲ or ▼ key to scroll through events. The most recent event is Event 1.                                                                                                                                                                              | <div>Main Menu:<br/>Diagnostics<br/>Parameter<br/>Device Select</div> <div>Event Q: 1 E3<br/>Ping Time Flt</div> |
| <b>Clearing Events</b><br><br>1. Access parameters in the adapter. Refer to <a href="#">Using the PowerFlex 7-Class HIM on page 3-2</a> .<br><br>2. Press the ▲ or ▼ key to scroll to <b>Diagnostics</b> .<br><br>3. Press the ↵ (Enter) key to display the Diagnostics menu in the adapter.<br><br>4. Repeat steps 2 and 3 to enter the <b>Events</b> option and then the <b>Clear Event</b> option or <b>Clr Event Queue</b> option. A message will pop up to confirm that you want to clear the message or queue.<br><br>5. Press the ↵ (Enter) key to confirm your request. If <b>Clr Event Queue</b> was selected, all event queue entries will then display "No Event." | <div>Dgn: Events<br/>View Event Queue<br/>Clear Event<br/>Clr Event Queue</div>                                  |

## Events

Many events in the event queue occur under normal operation. If you encounter unexpected communications problems, the events may help you or Allen-Bradley personnel troubleshoot the problem. The following events may appear in the event queue:

**Table 7.B Adapter Events**

| Code | Event            | Description                                                                                                                   |
|------|------------------|-------------------------------------------------------------------------------------------------------------------------------|
| 1    | No Event         | Empty event queue entry.                                                                                                      |
| 2    | DPI Bus Off Flt  | A bus-off condition was detected on DPI. This event may be caused by loose or broken cables or by noise.                      |
| 3    | Ping Time Flt    | A ping message was not received on DPI within the specified time.                                                             |
| 4    | Port ID Flt      | The adapter is not connected to a correct port on a DPI product.                                                              |
| 5    | Port Change Flt  | The DPI port changed after start up.                                                                                          |
| 6    | Host Sent Reset  | The drive sent a reset event message.                                                                                         |
| 7    | EEPROM Sum Flt   | The EEPROM in the adapter is corrupt.                                                                                         |
| 8    | Online @ 125kbps | The adapter detected that the drive is communicating at 125 kbps.                                                             |
| 9    | Online @ 500kbps | The adapter detected that the drive is communicating at 500 kbps.                                                             |
| 10   | Bad Host Flt     | The adapter was connected to an incompatible product.                                                                         |
| 11   | Dup Port Flt     | Another peripheral with the same port number is already in use.                                                               |
| 12   | Type 0 Login     | The adapter has logged in for Type 0 control.                                                                                 |
| 13   | Type 0 Time Flt  | The adapter has not received a Type 0 status message within the specified time.                                               |
| 14   | DL Login         | The adapter has logged into a Datalink.                                                                                       |
| 15   | DL Reject Flt    | The drive rejected an attempt to log in to a Datalink because the Datalink is not supported or is used by another peripheral. |
| 16   | DL Time Flt      | The adapter has not received a Datalink message within the specified time.                                                    |
| 17   | Reserved         | Not used.                                                                                                                     |
| 18   | Control Disabled | The adapter has sent a "Soft Control Disable" command to the drive.                                                           |
| 19   | Control Enabled  | The adapter has sent a "Soft Control Enable" command to the drive.                                                            |
| 20   | Message Timeout  | A Client-Server message sent by the adapter was not completed within 1 sec.                                                   |
| 21   | Flt Cfg Error    | One of the Flt Cfg xx parameters is set to a value greater than 65535 and the drive requires a 16-bit value.                  |
| 22   | App Updated      | Startup sequence detected new application firmware.                                                                           |
| 23   | EN Comm Flt      | The adapter detected a communications fault on the network.                                                                   |
| 24   | EN Sent Reset    | The adapter received a reset from the network.                                                                                |
| 25   | EN Close Flt     | An I/O connection from the network to the adapter was closed.                                                                 |
| 26   | EN Idle Flt      | The adapter is receiving "idle" packets from the network.                                                                     |
| 27   | EN Open          | An I/O connection from the network to the adapter has been opened.                                                            |
| 28   | EN Timeout Flt   | An I/O connection from the network to the adapter has timed out.                                                              |
| 29   | PCCC IO Close    | The device sending PCCC Control messages to the adapter has set the PCCC Control Timeout to zero.                             |
| 30   | PCCC IO Open     | The adapter has begun receiving PCCC control messages (the PCCC Control Timeout was previously set to a non-zero value).      |
| 31   | PCCC IO Time Flt | The adapter has not received a PCCC Control message for longer than the PCCC Control Timeout.                                 |
| 32   | Watchdog T/O Flt | The software detects a failure.                                                                                               |
| 33   | EEPROM Init      | Startup sequence detected a blank EEPROM map revision.                                                                        |
| 34   | Normal Startup   | The adapter successfully started up.                                                                                          |
| 35   | Manual Reset     | The adapter was reset by changing its Reset Module parameter.                                                                 |
| 36   | EN Link Down     | The Ethernet link was removed from the adapter.                                                                               |
| 37   | EN Link Up       | An Ethernet link is available for the adapter.                                                                                |
| 38   | BOOTP Response   | The adapter received a response to its BOOTP request.                                                                         |
| 39   | Dup IP Addr      | The adapter uses the same IP address as another device on the network.                                                        |
| 40   | Peer IO Open     | The adapter received the first Peer I/O message.                                                                              |
| 41   | Peer IO Time Flt | The adapter has not received a Peer I/O message for longer than the Peer I/O Timeout.                                         |

**Table 7.B Adapter Events (Continued)**

| Code | Event            | Description                                                                                                                                                 |
|------|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 42   | Email Failed     | The adapter encountered an error attempting to send a requested e-mail message.                                                                             |
| 43   | Msg Ctrl Open    | The timeout attribute in either the CIP Register or Assembly object was written with a non-zero value, allowing control messages to be sent to the adapter. |
| 44   | Msg Ctrl Close   | The timeout attribute in either the CIP Register or Assembly object was written with a zero value, disallowing control messages to be sent to the adapter.  |
| 45   | Msg Ctrl Timeout | The timeout attribute in either the CIP Register or Assembly object elapsed between accesses of those objects.                                              |
| 46   | OPT Open         | The adapter began exchanging I/O data with the I/O option of the DPI External Comms Kit.                                                                    |
| 47   | OPT Close        | The adapter forced a fault condition on the I/O option of the DPI External Comms Kit.                                                                       |
| 48   | OPT Timeout      | Communication between the adapter and I/O option of the DPI External Comms Kit was disrupted.                                                               |

## Viewing the Adapter's Web Pages

This chapter provides instructions on how to monitor the adapter and connected PowerFlex drive by using the adapter's web interface.

| Topic                                                  | Page |
|--------------------------------------------------------|------|
| <a href="#">Accessing the Adapter's Web Home Page</a>  | 8-1  |
| <a href="#">Process Display Pop-up Window</a>          | 8-4  |
| <a href="#">TCP/IP Configuration Web Page</a>          | 8-5  |
| <a href="#">Configure E-mail Notification Web Page</a> | 8-6  |
| <a href="#">DPI Device Information Pages</a>           | 8-9  |

Future enhancements may result in adapter web pages that look different than the examples shown in this chapter.

### Accessing the Adapter's Web Home Page

After configuring the adapter, you can view its web pages. These pages present information about the adapter, the drive to which it is connected, and the other DPI devices connected to the drive such as a HIM.



**TIP:** Series A adapter web pages are enabled differently than Series B.

- Series A adapter (version 2.003 or earlier)—By default the adapter web pages are enabled. To disable the web pages, use Bit 0 of **Parameter 54 - [Access Control]**. Refer to [Setting Web Access Control on page 3-16](#) for more information.
- Series B adapter (version 3.xxx or later)—By default the adapter web pages are disabled. To enable the web pages, set the Web Pages Switch (SW2 in [Figure 2.1](#)) to its “Enable Web” position and reset the adapter. **Parameter 55 - [Web Enable]** can be used to display the setting (Enabled or Disabled) of this switch.

The adapter can be configured to automatically send e-mail messages to desired addresses when selected drive faults occur and/or are cleared, and/or when the adapter takes a communication or idle fault action.

For Series A adapters, Bit 1 of **Parameter 54 - [Access Control]** can be used to protect the configured settings for the e-mail messaging feature. For Series B adapters, Bit 0 of **Parameter 56 - [Web Features]** can be used to protect the configured settings. For more details, see [Configure E-mail Notification Web Page on page 8-6](#).

Viewing the Web Pages of the Adapter

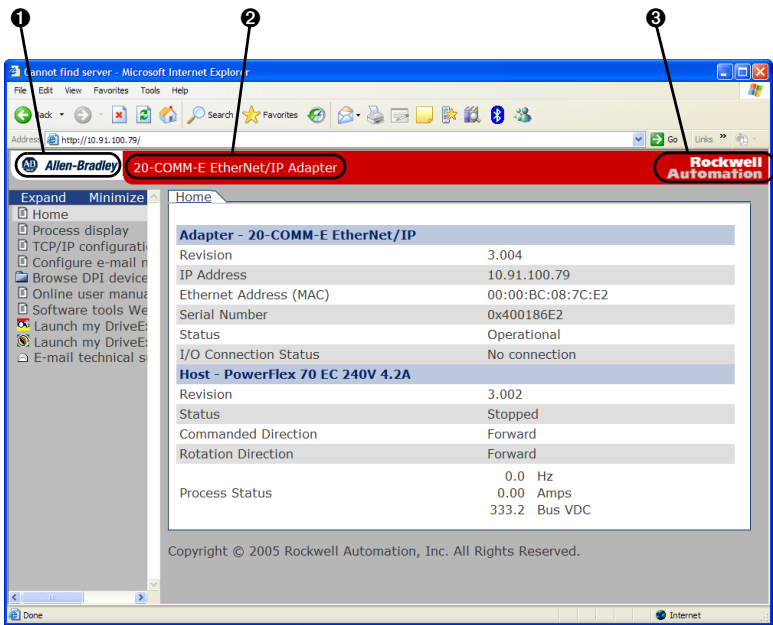
- 1. On a computer with access to the EtherNet/IP network on which the adapter/drive is installed, launch a web browser such as Microsoft™ Internet Explorer (version 5.0 or later).

The computer can access the adapter web pages if it is connected to:

- The same network as the adapter.
  - A network with access to the adapter’s network via a gateway device (for example, a router).
- 2. In the Address box, type the IP address of the adapter, and then press ENTER. The adapter web Home Page (Figure 8.1) should appear.

**Important:** Using the browser’s View > Refresh function will always re-display the adapter Home Page while viewing any of the adapter’s other web pages.

Figure 8.1 Adapter Web Home Page Example



Title Bar on Adapter Web Pages

The title bar appears on the adapter Home Page and all of the adapter’s other web pages. The title bar consists of three elements as shown in Figure 8.1:

| Title Bar Element          | Description                                                                       |
|----------------------------|-----------------------------------------------------------------------------------|
| 1 Allen-Bradley logo       | This logo is a hyperlink. Click it to view the ab.com web Home Page.              |
| 2 Adapter Title            | Shows the adapter type or user-configurable title.                                |
| 3 Rockwell Automation logo | This logo is a hyperlink. Click it to view the Rockwell Automation web Home Page. |

## Navigation Menu on Adapter Web Pages

The navigation menu appears on the left side of the adapter Home Page and all of the adapter's other web pages. The navigation menu consists of links and link folders which can be expanded or minimized. The following table shows all navigation menu links and link folders.

**Table 8.A Navigation Menu Links and Link Folders**

| Link/Folder                            | Description                                                                                                                                                                                                                                                                                                                                                           |
|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Home link                              | Click this link to view the adapter's Home Page ( <a href="#">Figure 8.1</a> ).                                                                                                                                                                                                                                                                                       |
| Process Display link                   | Click this link to view the host drive's Process Display pop-up window ( <a href="#">Figure 8.2</a> ).                                                                                                                                                                                                                                                                |
| TCP/IP configuration link              | Click this link to view the adapter's TCP/IP Configuration web page showing information about the TCP/IP configuration, such as the adapter's IP address and the number of packets being sent. <a href="#">Figure 8.3</a> shows an example TCP/IP Configuration web page.                                                                                             |
| Configure e-mail notification link     | Click this link to view the adapter's Configure E-mail Notification web page ( <a href="#">Figure 8.4</a> ) to configure the adapter to send automatic e-mail messages. E-mail notification can accommodate specific needs such as when only selected faults occur ( <a href="#">Figure 8.5</a> ). An example e-mail message is shown in <a href="#">Figure 8.7</a> . |
| Browse DPI devices folder              | Click this folder to expand and view the Port folders for all present DPI devices, including the drive, adapter, and other DPI devices connected to the drive such as a HIM.                                                                                                                                                                                          |
| Port x folders                         | Click a respective Port folder to expand and view its device's various links which take you to related information pages. For Port 0 (PowerFlex 70 Drive) example information pages, see <a href="#">Figure 8.8</a> , <a href="#">Figure 8.9</a> , and <a href="#">Figure 8.10</a> .                                                                                  |
| Online user manuals link               | Click this link to view Rockwell Automation's web page with documentation for drives and other devices.                                                                                                                                                                                                                                                               |
| Software tools Web site link           | Click this link to view Allen-Bradley's web page with information about software tools such as DriveExplorer and DriveExecutive.                                                                                                                                                                                                                                      |
| Launch my DriveExplorer software link  | Click this link to launch the DriveExplorer software already installed on your PC.                                                                                                                                                                                                                                                                                    |
| Launch my DriveExecutive software link | Click this link to launch the DriveExecutive software already installed on your PC.                                                                                                                                                                                                                                                                                   |
| E-mail technical support link          | Click this link to view a new e-mail message window to send a message to Allen-Bradley's Technical Support Team.                                                                                                                                                                                                                                                      |

## Information on Adapter Home Page

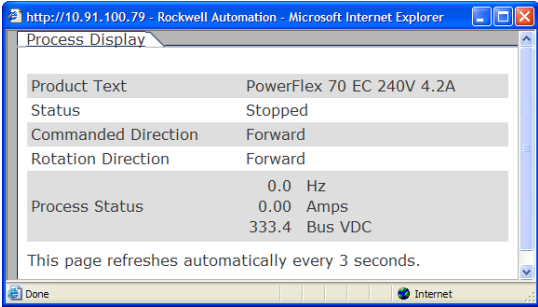
The adapter Home Page displays the following information for the adapter and its host drive:

| Information for | Description                                                                                                                                                                                      |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Adapter         | <ul style="list-style-type: none"> <li>• Revision</li> <li>• IP Address</li> <li>• Ethernet Address (MAC)</li> <li>• Serial Number</li> <li>• Status</li> <li>• I/O Connection Status</li> </ul> |
| Host "X" Drive  | <ul style="list-style-type: none"> <li>• Revision</li> <li>• Status</li> <li>• Commanded Direction</li> <li>• Rotation Direction</li> <li>• Process Status</li> </ul>                            |

Process Display Pop-up Window

The Process Display pop-up window dynamically shows the host drive’s information. To view this window, click the “Process display” link in the navigation menu.

Figure 8.2 Example of Process Display Pop-up Window

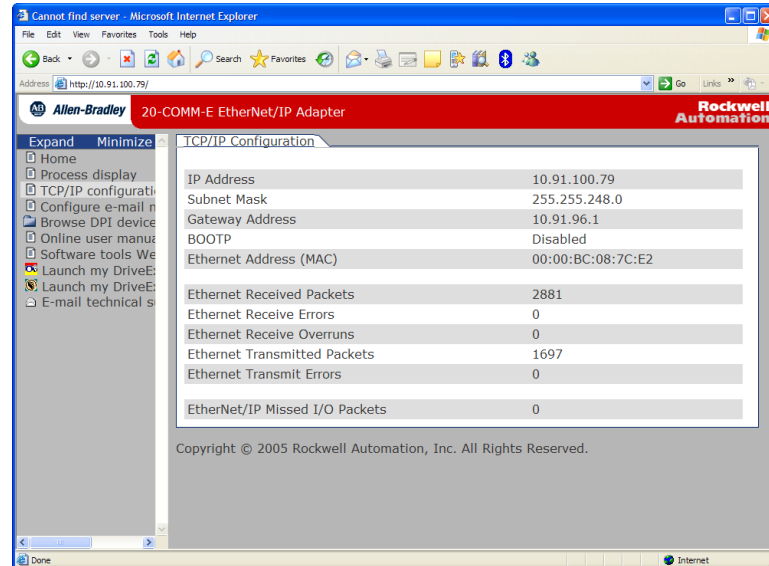


| Information         | Description                                                                                                                                                                                                         |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product Text        | Description of host drive.                                                                                                                                                                                          |
| Status              | Status of host drive.                                                                                                                                                                                               |
| Commanded Direction | Commanded direction of host drive.                                                                                                                                                                                  |
| Rotation Direction  | Rotation direction of host drive.                                                                                                                                                                                   |
| Process Status      |                                                                                                                                                                                                                     |
| 1st Line            | Dynamic value of the host drive feedback parameter (not selectable).                                                                                                                                                |
| Lines 2 and 3       | Dynamic value of each default displayed host drive parameter (selectable).<br>(Line 2 and 3 default displayed host drive parameters can be changed using a HIM, DriveExecutive software or DriveExplorer software.) |

## TCP/IP Configuration Web Page

The TCP/IP Configuration web page provides information about the adapter's Ethernet settings and network activities. To view this web page, click the "TCP/IP configuration" link (highlighted in [Figure 8.3](#)) in the navigation menu.

**Figure 8.3 Example of TCP/IP Configuration Web Page**

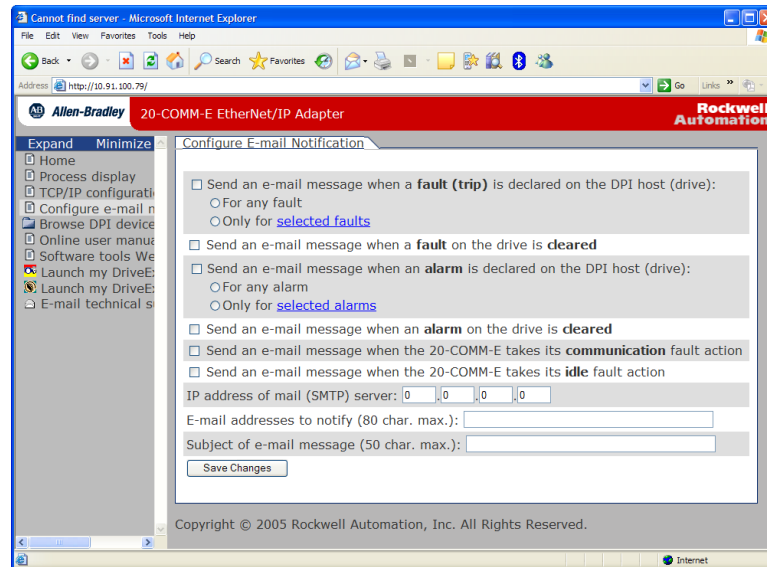


| Information                    | Description                                                                               |
|--------------------------------|-------------------------------------------------------------------------------------------|
| IP Address                     | IP address of the adapter.                                                                |
| Subnet Mask                    | Subnet mask for the adapter's network.                                                    |
| Gateway Address                | Address for the gateway device on the adapter's network.                                  |
| BOOTP                          | Shows status for BOOTP, which may be used to configure the adapter's network information. |
| Ethernet Address (MAC)         | Hardware address for the adapter.                                                         |
| Ethernet Received Packets      | Number of packets that the adapter has received.                                          |
| Ethernet Receive Errors        | Number of receive errors reported by the hardware.                                        |
| Ethernet Receive Overruns      | Number of receive buffer overruns reported by the hardware.                               |
| Ethernet Transmitted Packets   | Number of packets that the adapter has sent.                                              |
| Ethernet Transmit Errors       | Number of transmit errors reported by the hardware.                                       |
| EtherNet/IP Missed I/O Packets | Number of I/O connection packets that the adapter did not receive.                        |

## Configure E-mail Notification Web Page

The Configure E-mail Notification web page contains selections and data fields for configuring the adapter to automatically send e-mail messages to desired addresses when selected types of events occur. To view this web page, click the “Configure e-mail...” link (highlighted in [Figure 8.4](#)) in the navigation menu.

**Figure 8.4** Example of Configure E-mail Notification Web Page



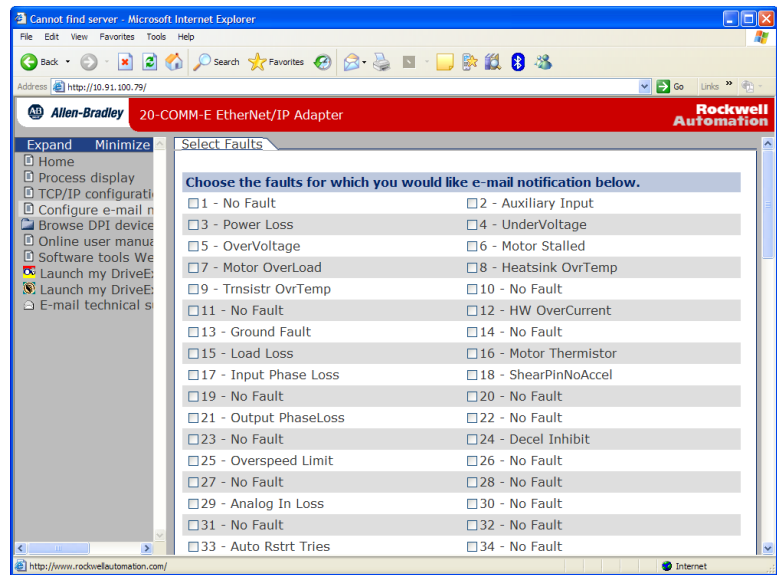
E-mail configuration for Series A adapters is enabled and disabled differently than Series B adapters.

- Series A adapters (version 2.003 or earlier)—By default, settings are protected and the user needs to enable configuration by using **Parameter 54 - [Access Control]** to set the E-mail Config Bit 1 value to “1” (Enabled). After configuration, settings can be protected by changing the E-mail Config Bit 1 value back to “0” (Disabled).
- Series B adapters (version 3.xxx or later)—By default, settings are not protected. After configuration, settings can be protected by using **Parameter 56 - [Web Features]** to set E-mail Cfg Bit 0 value to “0” (Disabled). To change a protected configuration, it must first be unprotected by setting the E-mail Cfg Bit 0 value back to “1” (Enabled).

To configure e-mail notification:

1. Click the desired “Send an e-mail message when...” check boxes you want to occur that will send e-mail notification. If you only want e-mail notification when selected faults/alarm occur:
    - A. Click the respective fault and/or alarm radio buttons.
    - B. Click the “selected faults” link and/or “selected alarms” link.
- [Figure 8.5](#) shows an example faults configuration page.

Figure 8.5 Example of Selected Faults Configuration Page



- C. Click the desired fault/alarm check boxes, and click **Save Changes**.
  - D. Click the “Back to E-mail Configuration Page” link.
2. Type the following information in their respective boxes:

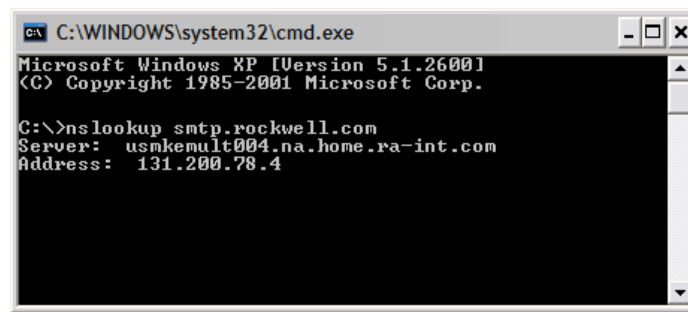
| Information                     | Description                                                                                                                                                                                          |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| “IP address of...”              | Type in the address of the mail server that will be used to deliver the e-mail messages. (When the IP address is unknown, read the TIP shown below this table to determine the mail server address.) |
| “E-mail addresses to notify...” | Type in addresses to where you want e-mail messages to be sent. Multiple addresses can be used, but they must be separated by commas (comma delimited).                                              |
| “Subject of e-mail message...”  | Type in the desired subject text for the e-mail message.                                                                                                                                             |



**TIP:** If the IP address of the e-mail server is unknown, you can contact your IT department or use the following DOS command instructions to find its IP address:

- A. On the Windows task bar, click **Start > Run** to display the Run window.
- B. In the Run window Open field, type “cmd” and click **OK** to display the DOS window.
- C. On the c:\ > command line, type “nslookup [name of e-mail server].” The entry “c:\ > nslookup smtp.company.com” is an example.
- D. Press **ENTER** to display the e-mail server IP address ([Figure 8.6](#)).

Figure 8.6 DOS Window Example Showing E-mail Server IP Address



The IP address shown in the DOS window (for this example, 131.200.78.4) should be typed into the E-mail Notification Web Page shown in [Figure 8.4](#).

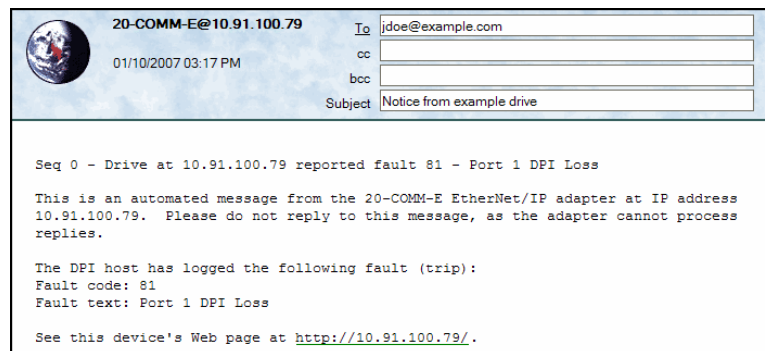
### 3. Click **Save changes**.

**Important:** After configuring E-mail Notification, it is recommended to protect the settings. Otherwise the configuration can be changed anytime the web page is accessed with a browser. To protect the settings:

- Series A Adapters—Use **Parameter 54 - [Access Control]** to set E-mail Config Bit 1 value to “0” (Disabled).
- Series B Adapters—Use **Parameter 56 - [Web Features]** to set E-mail Cfg Bit 0 value to “0” (Disabled).

[Figure 8.7](#) shows an example e-mail message automatically sent by the adapter in response to selected events.

Figure 8.7 Example of E-mail Message Sent by Adapter



**TIP:** To stop e-mail messages, uncheck all of the “Send an e-mail message when...” boxes.

- For Series A adapters, disabling the adapter web pages by using **Parameter 54 - [Access Control]** to set the Web Enable Bit 0 value to “0” (Disabled) will NOT stop the adapter from sending e-mail messages.
- For Series B adapters, disabling the adapter web pages by setting the Web Pages Switch (SW2 in [Figure 2.1](#)) to the “Disable Web” position will NOT stop the adapter from sending e-mail messages.

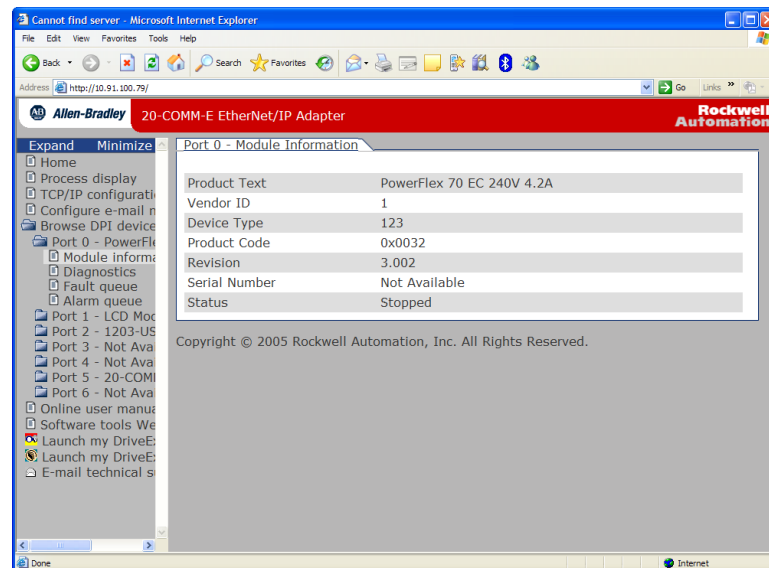
## DPI Device Information Pages

DPI device information pages are viewed by clicking on the respective links in the navigation menu:

| Web Page                   | Description                                                                                                                                                             |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Module Information         | Shows module information for the respective Port device. For example, <a href="#">Figure 8.8</a> shows module information for the Port 0 device (host drive).           |
| Diagnostic Items           | Shows diagnostic item information for the respective Port device. For example, <a href="#">Figure 8.9</a> shows diagnostic items for the Port 0 device (host drive).    |
| Fault Queue                | Shows fault queue information for the respective Port device. For example, <a href="#">Figure 8.10</a> shows the fault queue for the Port 0 device (host drive).        |
| Alarm Queue <sup>(1)</sup> | Shows alarm queue information for the respective Port device. For example, <a href="#">Figure 8.11</a> shows the alarm queue for the Port 0 device (host drive).        |
| Event Queue <sup>(1)</sup> | Shows event queue information for the respective Port device. For example, <a href="#">Figure 8.12</a> shows the event queue for the Port 5 device (22-COMM-E adapter). |

<sup>(1)</sup> Information shown only when supported by the device.

**Figure 8.8 Example of Port 0 (PowerFlex 70 Drive) Module Information Page**



| Information   | Description                                           |
|---------------|-------------------------------------------------------|
| Product Text  | Text identifying the device                           |
| Vendor ID     | 1 = Allen-Bradley                                     |
| Device Type   | 123                                                   |
| Product Code  | Code for the product name and its rating              |
| Revision      | Firmware revision used by the device                  |
| Serial Number | Serial number of the device                           |
| Status        | Operating status of the device (for example, faulted) |

Figure 8.9 Example of Port 0 (PowerFlex 70 Drive) Diagnostic Items Page

| Item no. | Description      | Value  | Units |
|----------|------------------|--------|-------|
| 1        | DPI Error Status | 2      |       |
| 2        | Heatsink Temp    | 34.5   | degC  |
| 3        | Active Cur Limit | 6646   |       |
| 4        | Active PWM Freq  | 12     | kHz   |
| 5        | Life MegaWatt Hr | 22.6   | MWh   |
| 6        | Life Run Time    | 106.0  | Hrs   |
| 7        | Life Pwr Up Time | 1496.6 | Hrs   |
| 8        | Life Pwr Cycles  | 514    |       |
| 9        | Life MW Fraction | 56756  |       |
| 10       | Life MW Units    | 41472  |       |
| 11       | Reserved         | 0      |       |
| 12       | Raw In 1 ma      | 5      |       |
| 13       | Raw In 1 volts   | 2      |       |
| 14       | Raw In 2 plus    | 6      |       |
| 15       | Raw In 2 minus   | 1      |       |
| 16       | CS Msg Rx Cnt    | 2053   |       |
| 17       | CS Msg Tx Cnt    | 2061   |       |
| 18       | CS Timeout Cnt   | 0      |       |

Figure 8.10 Example of Port 0 (PowerFlex 70 Drive) Fault Queue Page

| Entry no. | Fault code | Description     | Time stamp    |
|-----------|------------|-----------------|---------------|
| 1         | 49         | Drive Powerup   | 288:05:27.048 |
| 2         | 52         | Faults Cleared  | 239:37:03.472 |
| 3         | 85         | Port 5 DPI Loss | 239:37:00.952 |
| 4         | 82         | Port 2 DPI Loss | 236:51:56.992 |
| 5         | 52         | Faults Cleared  | 236:50:41.752 |
| 6         | 81         | Port 1 DPI Loss | 188:07:45.952 |
| 7         | 52         | Faults Cleared  | 43:45:04.792  |
| 8         | 81         | Port 1 DPI Loss | 904:25:18.592 |
| 9         | 52         | Faults Cleared  | 859:13:46.312 |
| 10        | 0          | No Fault        | 00:00:00.000  |
| 11        | 52         | Faults Cleared  | 854:52:59.272 |
| 12        | 25         | Overspeed Limit | 854:49:59.992 |
| 13        | 52         | Faults Cleared  | 737:11:18.352 |
| 14        | 25         | Overspeed Limit | 737:10:45.232 |
| 15        | 52         | Faults Cleared  | 737:10:41.632 |
| 16        | 25         | Overspeed Limit | 737:10:26.512 |

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**NOTE:** For drives that do not support an alarm queue, the adapter will still display an alarm queue web page ([Figure 8.11](#)), but show that the alarm queue is not available.

Figure 8.11 Example of Port 0 (PowerFlex 70 Drive) Alarm Queue Page

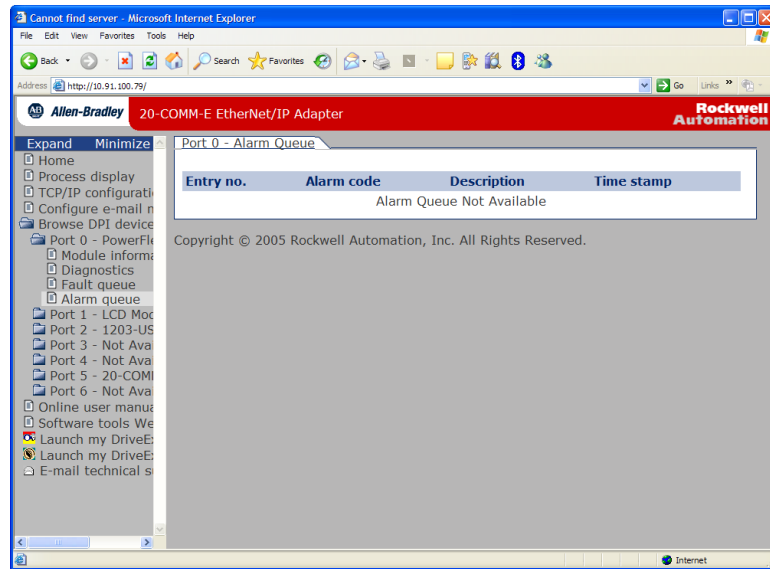
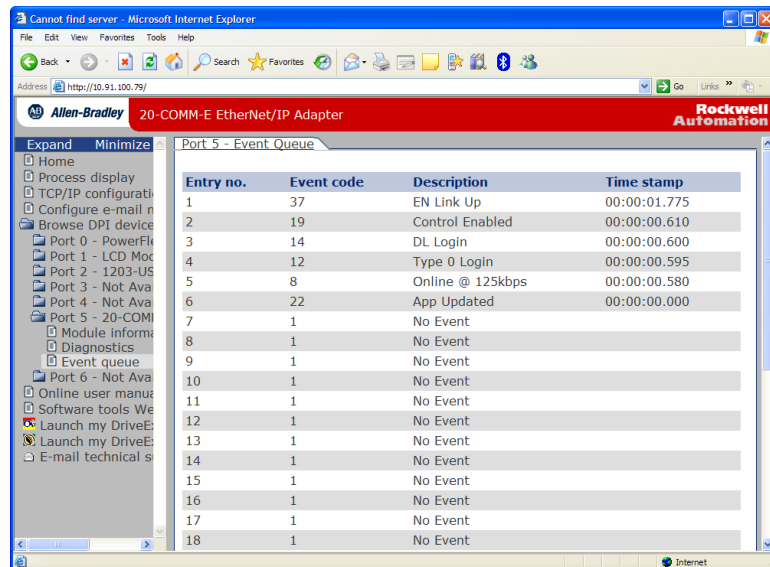


Figure 8.12 shows an example event queue page for the Port 5 device (20-COMM-E adapter).

Figure 8.12 Example of Port 5 (20-COMM-E Adapter) Event Queue Page



## Notes:

## Using the Adapter in a DPI External Comms Kit (20-XCOMM-DC-BASE)

This chapter provides information and examples that explain how to use the adapter in a DPI External Comms Kit (20-XCOMM-DC-BASE).

The adapter is typically installed in the internal communication slot on the PowerFlex 7-Class drive. However, an externally-mounted adapter may be desired when:

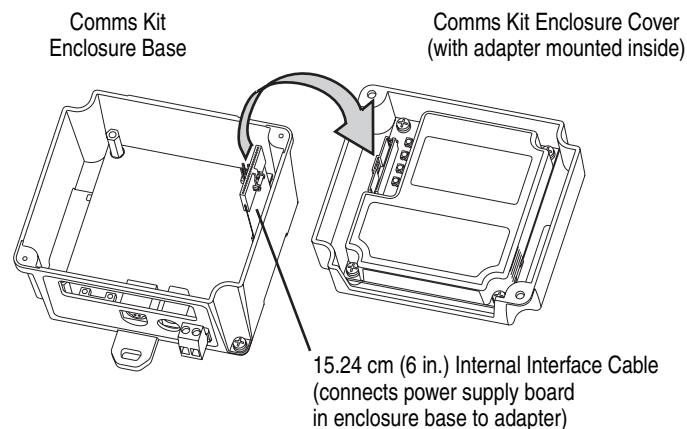
- The PowerFlex drive is already connected to an existing network, such as Remote I/O, and a second network is desired for software tools (DriveExplorer, DriveExecutive, etc.), data collection, etc.
- The PowerFlex drive is remotely located next to some I/O devices that also need to be networked. The DPI External Comms Kit has an option slot for general-purpose network I/O that a controller can use. Both the drive and I/O devices are handled as one node on the network to reduce the network node count.

| Topic                                                                | Page                |
|----------------------------------------------------------------------|---------------------|
| <a href="#">Installing the Adapter</a>                               | <a href="#">9-1</a> |
| <a href="#">I/O Board Option (20-XCOMM-IO-OPT1)</a>                  | <a href="#">9-2</a> |
| <a href="#">Understanding the I/O Image (Drive + I/O Option)</a>     | <a href="#">9-2</a> |
| <a href="#">Configuring the Adapter to Use the Optional I/O Data</a> | <a href="#">9-3</a> |
| <a href="#">Viewing Optional I/O Diagnostic Items</a>                | <a href="#">9-4</a> |

### Installing the Adapter

The adapter can be installed in a DPI External Comms Kit.

**Figure 9.1 Mounting and Connecting the Adapter**

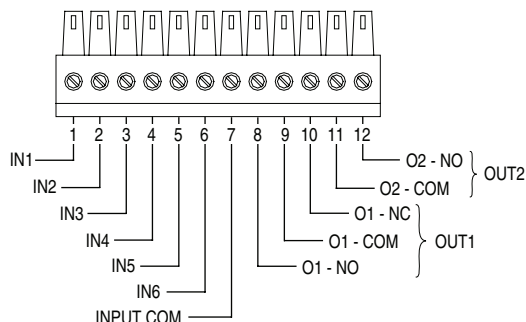


For more information, refer to the *DPI External Communications Kit Installation Instructions* (publication 20COMM-IN001).

## I/O Board Option (20-XCOMM-IO-OPT1)

The I/O Board option, when installed in the DPI External Comms Kit, can be used with the adapter (Series B, firmware version 3.xxx or later required). The I/O Board provides (6) DC inputs and (2) Relay outputs for use by a controller on the network.

**Figure 9.2 I/O Connector Function Descriptions**

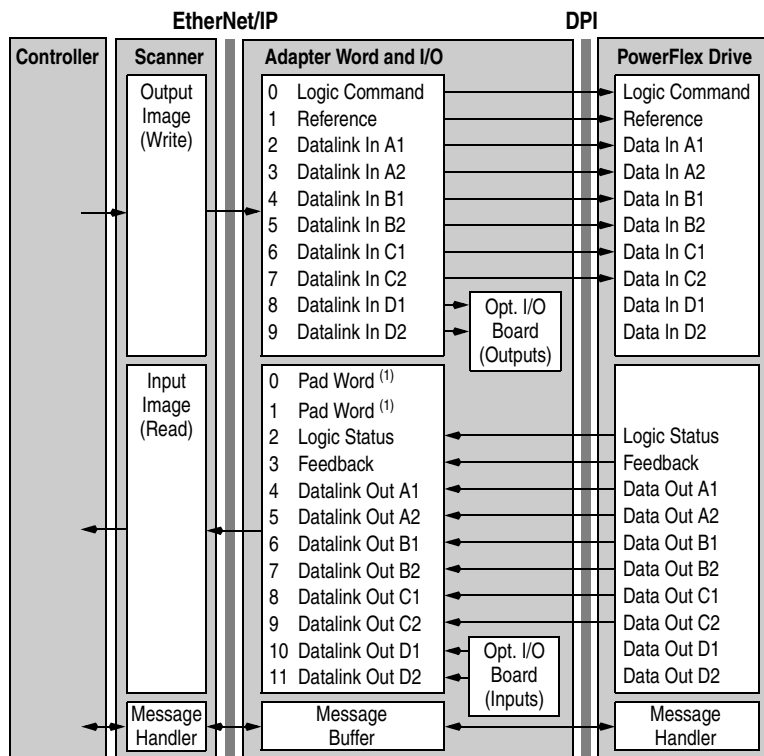


For more information, refer to the *I/O Board Option Installation Instructions* (publication 20COMM-IN002).

## Understanding the I/O Image (Drive + I/O Option)

The data for the optional I/O Board is sent over the I/O connection using Datalink D. When the optional I/O Board is installed in the DPI External Comms Kit, Datalink D is dedicated for this function only and is not available for other uses. When the adapter detects the presence of the optional I/O Board, the I/O image is modified as shown in [Figure 9.3](#).

**Figure 9.3 Example I/O Image – Datalink D Dedicated to I/O Board and All I/O Enabled**



<sup>(1)</sup> Required by ControlLogix when using the Generic Profile. May or may not be required by other types of controllers.

The data from the I/O Board is loaded into the Datalink word starting with bit 0 of Datalink D1 and concluding with bit 14. Bit 15 of Datalink D1 is reserved as an input valid Status flag. When the input data is valid, bit 15 = 1.

For example, for the 20-XCOMM-IO-OPT1, the digital inputs and digital outputs are mapped as shown in [Figure 9.4](#) and [Figure 9.5](#) respectively.

**Figure 9.4 I/O Board Option Digital Input Mapping**

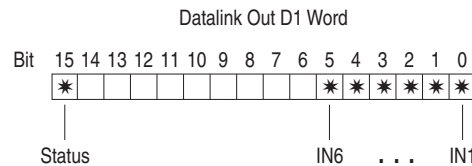
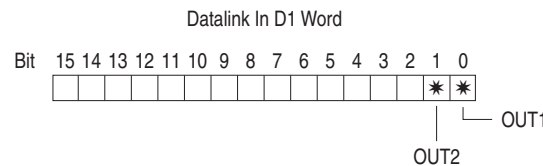


**Figure 9.5 I/O Board Option Digital Output Mapping**



**Important:** On power-up or reset, the outputs will be in a “non-activated” state.

## Configuring the Adapter to Use the Optional I/O Data

To configure the adapter to use the optional I/O Board, **Parameters 23 - [DPI I/O Cfg]**, **35 - [M-S Input]**, and **36 - [M-S Output]** must be set. To send input/output data from the optional I/O board to the network:

- Turn on bit 4 (“1xxxx”) in **Parameter 35 - [M-S Input]**.
- Turn on bit 4 (“1xxxx”) in **Parameter 36 - [M-S Output]**.
- Turn off bit 4 (“0xxxx”) in **Parameter 23 - [DPI I/O Cfg]**.

Setting the Datalink D bit 4 in the M-S Input and M-S Output parameters directs the communication adapter to send Datalink D back to the controller. Turning off bit 4 in the DPI I/O Cfg parameter directs the communication adapter to not send Datalink D data back to the drive. For more information on I/O Messaging and Configuring Datalinks, see [Chapter 5, Using the I/O](#).

If the I/O Board Fault Action Jumper (JMP1) is set to the Fault Configurable position, **Parameter 33 - [Flt Cfg D1 In]** is used to set the states of the outputs when the I/O Board takes its Fault Action. For details on setting the Fault Action Jumper, see the *I/O Board Option Installation Instructions* (publication 20COMM-IN002).

## Viewing Optional I/O Diagnostic Items

Viewing communication adapter diagnostic item 56 (OPT Status) shows the operating status of the optional I/O board:

| Bit | State  | Status Indication | Description                                   |
|-----|--------|-------------------|-----------------------------------------------|
| 0   | 1 (On) | OPT Present       | I/O data is being exchanged with the adapter. |
| 1   | 1 (On) | OPT Faulted       | The I/O board is taking its fault action.     |
| 2   | 1 (On) | Hold Last         | Fault Action is "Hold Last."                  |
| 3   | 1 (On) | Send Flt Cfg      | Fault Action is "Fault Config."               |

Viewing communication adapter diagnostic item 57 (OPT RX Errors) shows the number of I/O board receive errors.

Viewing communication adapter diagnostic item 58 (OPT FW Version) shows the present firmware version of the optional I/O board.

Diagnostic item 13 (Datalink D1 In) will show the status of the outputs as a combined decimal value. For example, a “0” decimal (“00” binary) indicates both outputs are off and a “3” decimal (“11” binary) indicates both outputs are on. **NOTE:** A status bit is not used for outputs.

Diagnostic item 21 (Datalink D1 Out) will show the status of the inputs as a combined decimal value, including the status bit 15. For example, [Figure 9.6](#) shows inputs that are valid and all on, and [Figure 9.7](#) shows inputs that are valid and all off (zero).

**Figure 9.6 Valid Inputs All On**

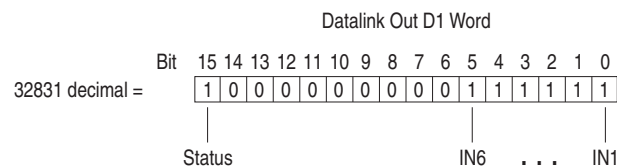
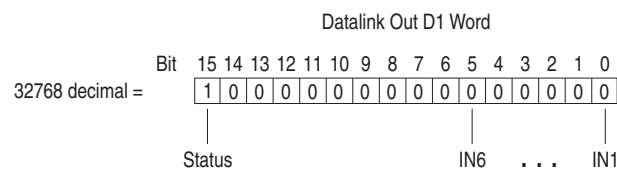


**Figure 9.7 Valid Inputs All Off**



## Specifications

Appendix A presents the specifications for the adapter.

| Topic                                 | Page                |
|---------------------------------------|---------------------|
| <a href="#">Communications</a>        | <a href="#">A-1</a> |
| <a href="#">Electrical</a>            | <a href="#">A-1</a> |
| <a href="#">Mechanical</a>            | <a href="#">A-2</a> |
| <a href="#">Environmental</a>         | <a href="#">A-2</a> |
| <a href="#">Regulatory Compliance</a> | <a href="#">A-2</a> |

### Communications

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Network Protocol                | EtherNet/IP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Data Rates                      | 10 Mbps Full Duplex<br>10 Mbps Half Duplex<br>100 Mbps Full Duplex<br>100 Mbps Half Duplex                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Connection Limits               | 30 TCP connections<br>16 simultaneous CIP connections including 1 exclusive-owner I/O connection<br><br>The following activities use a CIP connection: <ul style="list-style-type: none"> <li>• Class I I/O connections (for example, from a ControlLogix controller)</li> <li>• Explicit messaging where “connected” is chosen (for example, in a checkbox in RSLogix 5000)</li> <li>• DriveExecutive connections to the drive</li> </ul> The following activities DO NOT use a CIP connection: <ul style="list-style-type: none"> <li>• Explicit messaging-based control using PCCC or the Register or Assembly objects, including the PLC-5, SLC 500, and MicroLogix 1100 examples in Chapter 4</li> <li>• Explicit messaging where “connected” is NOT chosen, which is typically the default</li> <li>• DriveExplorer connections to the drive</li> </ul> |
| Requested Packet Interval (RPI) | 5 ms minimum                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Packet Rate                     | Up to 400 total I/O packets per second (200 in and 200 out)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Drive Protocol                  | DPI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Drive Data Rates                | 125 kbps or 500 kbps                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

### Electrical

|             |                                                                        |
|-------------|------------------------------------------------------------------------|
| Consumption |                                                                        |
| Drive       | 350 mA at 5 VDC supplied by the host (drive or DPI External Comms Kit) |
| Network     | None                                                                   |

## Mechanical

|            |                       |
|------------|-----------------------|
| Dimensions |                       |
| Height     | 19 mm (0.75 inches)   |
| Length     | 86 mm (3.39 inches)   |
| Width      | 78.5 mm (3.09 inches) |
| Weight     | 85 g (3 oz.)          |

## Environmental

|                   |                                                                                                                                                                                                                                                                                                               |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Temperature       |                                                                                                                                                                                                                                                                                                               |
| Operating         | -10...50°C (14...122°F)                                                                                                                                                                                                                                                                                       |
| Storage           | -40...85°C (-40...185°F)                                                                                                                                                                                                                                                                                      |
| Relative Humidity | 5...95% non-condensing                                                                                                                                                                                                                                                                                        |
| Atmosphere        | <b>Important:</b> The adapter <b>must not</b> be installed in an area where the ambient atmosphere contains volatile or corrosive gas, vapors or dust. If the adapter is not going to be installed for a period of time, it must be stored in an area where it will not be exposed to a corrosive atmosphere. |

## Regulatory Compliance

| Certification | Specification              |
|---------------|----------------------------|
| UL            | UL508C                     |
| cUL           | CAN / CSA C22.2 No. 14-M91 |
| CE            | EN50178 and EN61800-3      |
| CTick         | EN61800-3                  |

**NOTE:** This is a product of category C2 according to IEC 61800-3. In a domestic environment this product may cause radio interference in which case supplementary mitigation measures may be required.



| Parameter |                                                                                                                                                                                                                                                                                                                                                                                                                     | Details                                                                                                                                                                                               |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| No.       | Name and Description                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                       |
| 08        | [Subnet Cfg 1]                                                                                                                                                                                                                                                                                                                                                                                                      | Default: 0                                                                                                                                                                                            |
| 09        | [Subnet Cfg 2]                                                                                                                                                                                                                                                                                                                                                                                                      | Default: 0                                                                                                                                                                                            |
| 10        | [Subnet Cfg 3]                                                                                                                                                                                                                                                                                                                                                                                                      | Default: 0                                                                                                                                                                                            |
| 11        | [Subnet Cfg 4]                                                                                                                                                                                                                                                                                                                                                                                                      | Default: 0                                                                                                                                                                                            |
|           | <p>Sets the bytes of the subnet mask.</p> <pre>           255 . 255 . 255 . 255                             [Subnet Cfg 1]                             [Subnet Cfg 2]                             [Subnet Cfg 3]                             [Subnet Cfg 4] </pre> <p><b>Important:</b> To set the subnet mask using these parameters, <b>Parameter 03 - [BOOTP]</b> must be set to "0" (Disabled).</p>             | <p>Minimum: 0</p> <p>Maximum: 255</p> <p>Type: Read/Write</p> <p>Reset Required: Yes</p>                                                                                                              |
| 12        | [Gateway Cfg 1]                                                                                                                                                                                                                                                                                                                                                                                                     | Default: 0                                                                                                                                                                                            |
| 13        | [Gateway Cfg 2]                                                                                                                                                                                                                                                                                                                                                                                                     | Default: 0                                                                                                                                                                                            |
| 14        | [Gateway Cfg 3]                                                                                                                                                                                                                                                                                                                                                                                                     | Default: 0                                                                                                                                                                                            |
| 15        | [Gateway Cfg 4]                                                                                                                                                                                                                                                                                                                                                                                                     | Default: 0                                                                                                                                                                                            |
|           | <p>Sets the bytes of the gateway address.</p> <pre>           255 . 255 . 255 . 255                             [Gateway Cfg 1]                             [Gateway Cfg 2]                             [Gateway Cfg 3]                             [Gateway Cfg 4] </pre> <p><b>Important:</b> To set the gateway address using these parameters, <b>Parameter 03 - [BOOTP]</b> must be set to "0" (Disabled).</p> | <p>Minimum: 0</p> <p>Maximum: 255</p> <p>Type: Read/Write</p> <p>Reset Required: Yes</p>                                                                                                              |
| 16        | [EN Rate Cfg]                                                                                                                                                                                                                                                                                                                                                                                                       | <p>Default: 0 = Autodetect</p> <p>Values: 0 = Autodetect<br/>1 = 10 Mbps Full<br/>2 = 10 Mbps Half<br/>3 = 100 Mbps Full<br/>4 = 100 Mbps Half</p> <p>Type: Read/Write</p> <p>Reset Required: Yes</p> |
| 17        | [EN Rate Act]                                                                                                                                                                                                                                                                                                                                                                                                       | <p>Default: 0 = No Link</p> <p>Values: 0 = No Link<br/>1 = 10 Mbps Full<br/>2 = 10 Mbps Half<br/>3 = 100 Mbps Full<br/>4 = 100 Mbps Half</p> <p>Type: Read Only</p>                                   |
| 18        | [Ref/Fdbk Size]                                                                                                                                                                                                                                                                                                                                                                                                     | <p>Default: 0 = 16-bit</p> <p>Values: 0 = 16-bit<br/>1 = 32-bit</p> <p>Type: Read Only</p>                                                                                                            |
| 19        | [Datalink Size]                                                                                                                                                                                                                                                                                                                                                                                                     | <p>Default: 0 = 16-bit</p> <p>Values: 0 = 16-bit<br/>1 = 32-bit</p> <p>Type: Read Only</p>                                                                                                            |

Parameter

| No.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Name and Description                                                                                                                                                                                                                                                                                                                                                                                  | Details                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                |            |            |            |            |            |            |            |         |         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|------------|------------|------------|------------|------------|------------|------------|---------|---------|---|---|---|---|---|---|---|---|-----|---|---|---|---|---|---|---|---|
| 20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <div><div>[Reset Module]</div><div>No action if set to “0” (Ready). Resets the adapter if set to “1” (Reset Module). Restores the adapter to its factory default settings if set to “2” (Set Defaults). This parameter is a command. It will be reset to “0” (Ready) after the command has been performed.</div></div>                                                                                | <div><div>Default:</div><div>0 = Ready</div><div>Values:</div><div>0 = Ready</div><div>1 = Reset Module</div><div>2 = Set Defaults</div><div>Type:</div><div>Read/Write</div><div>Reset Required:</div><div>No</div></div>                                                                                                                                                                                                                                                                                                                                                                                                         |                |            |            |            |            |            |            |            |         |         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |
| <div><div></div><div><b>ATTENTION:</b> Risk of injury or equipment damage exists. If the adapter is transmitting I/O that controls the drive, the drive may fault when you reset the adapter. Determine how your drive will respond before resetting a connected adapter.</div></div>                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                |            |            |            |            |            |            |            |         |         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |
| 21                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <div><div>[Comm Flt Action]</div><div>Sets the action that the adapter and drive will take if the adapter detects that I/O messaging communications have been disrupted. This setting is effective only if I/O that controls the drive is transmitted through the adapter. When communication is re-established, the drive will automatically receive commands over the network again.</div></div>    | <div><div>Default:</div><div>0 = Fault</div><div>Values:</div><div>0 = Fault</div><div>1 = Stop</div><div>2 = Zero Data</div><div>3 = Hold Last</div><div>4 = Send Flt Cfg</div><div>Type:</div><div>Read/Write</div><div>Reset Required:</div><div>No</div></div>                                                                                                                                                                                                                                                                                                                                                                 |                |            |            |            |            |            |            |            |         |         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |
| <div><div></div><div><b>ATTENTION:</b> Risk of injury or equipment damage exists. <b>Parameter 21 - [Comm Flt Action]</b> lets you determine the action of the adapter and connected drive if I/O communications are disrupted. By default, this parameter faults the drive. You can set this parameter so that the drive continues to run. Precautions should be taken to ensure that the setting of this parameter does not create a risk of injury or equipment damage. When commissioning the drive, verify that your system responds correctly to various situations (for example, a disconnected cable).</div></div> |                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                |            |            |            |            |            |            |            |         |         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |
| 22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <div><div>[Idle Flt Action]</div><div>Sets the action that the adapter and drive will take if the adapter detects that the controller is in program mode or faulted. This setting is effective only if I/O that controls the drive is transmitted through the adapter. When the controller is put back in Run mode, the drive will automatically receive commands over the network again.</div></div> | <div><div>Default:</div><div>0 = Fault</div><div>Values:</div><div>0 = Fault</div><div>1 = Stop</div><div>2 = Zero Data</div><div>3 = Hold Last</div><div>4 = Send Flt Cfg</div><div>Type:</div><div>Read/Write</div><div>Reset Required:</div><div>No</div></div>                                                                                                                                                                                                                                                                                                                                                                 |                |            |            |            |            |            |            |            |         |         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |
| <div><div></div><div><b>ATTENTION:</b> Risk of injury or equipment damage exists. <b>Parameter 22 - [Idle Flt Action]</b> lets you determine the action of the adapter and connected drive when the controller is idle. By default, this parameter faults the drive. You can set this parameter so that the drive continues to run. Precautions should be taken to ensure that the setting of this parameter does not create a risk of injury or equipment damage. When commissioning the drive, verify that your system responds correctly to various situations (for example, a faulted controller).</div></div>       |                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                |            |            |            |            |            |            |            |         |         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |
| 23                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <div><div>[DPI I/O Cfg]</div><div>Sets the I/O that is transferred through the adapter.</div></div>                                                                                                                                                                                                                                                                                                   | <div><div>Default:</div><div>xxx0 0001</div><div>Bit Values:</div><div>0 = I/O disabled</div><div>1 = I/O enabled</div><div>Type:</div><div>Read/Write</div><div>Reset Required:</div><div>Yes</div></div> <div><table><tr><th>Bit Definition</th><th>Not Used</th><th>Not Used</th><th>Not Used</th><th>Datalink D</th><th>Datalink C</th><th>Datalink B</th><th>Datalink A</th><th>Cmd/Ref</th></tr><tr><td>Default</td><td>x</td><td>x</td><td>x</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td></tr><tr><td>Bit</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr></table></div> | Bit Definition | Not Used   | Not Used   | Not Used   | Datalink D | Datalink C | Datalink B | Datalink A | Cmd/Ref | Default | x | x | x | 0 | 0 | 0 | 0 | 1 | Bit | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Bit Definition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Not Used                                                                                                                                                                                                                                                                                                                                                                                              | Not Used                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Not Used       | Datalink D | Datalink C | Datalink B | Datalink A | Cmd/Ref    |            |            |         |         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |
| Default                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | x                                                                                                                                                                                                                                                                                                                                                                                                     | x                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | x              | 0          | 0          | 0          | 0          | 1          |            |            |         |         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |
| Bit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 7                                                                                                                                                                                                                                                                                                                                                                                                     | 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 5              | 4          | 3          | 2          | 1          | 0          |            |            |         |         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |

| Parameter      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                              |          |                |            |            |            |            |            |            |            |         |         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------------|------------|------------|------------|------------|------------|------------|------------|---------|---------|---|---|---|---|---|---|---|---|-----|---|---|---|---|---|---|---|---|
| No.            | Name and Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Details                                                                                                                                                                                                                                                                                                                                                                                                      |          |                |            |            |            |            |            |            |            |         |         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |
| 24             | <b>[DPI I/O Act]</b><br><br>Displays the I/O that the adapter is actively transmitting. The value of this parameter will usually be equal to the value of <b>Parameter 23 - [DPI I/O Cfg]</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Default: xxx0 0001<br>Bit Values: 0 = I/O disabled<br>1 = I/O enabled<br>Type: Read Only                                                                                                                                                                                                                                                                                                                     |          |                |            |            |            |            |            |            |            |         |         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |
|                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <table><tr><th>Bit Definition</th><th>Not Used</th><th>Not Used</th><th>Not Used</th><th>Datalink D</th><th>Datalink C</th><th>Datalink B</th><th>Datalink A</th><th>Cmd/Ref</th></tr><tr><td>Default</td><td>x</td><td>x</td><td>x</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td></tr><tr><td>Bit</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr></table> |          | Bit Definition | Not Used   | Not Used   | Not Used   | Datalink D | Datalink C | Datalink B | Datalink A | Cmd/Ref | Default | x | x | x | 0 | 0 | 0 | 0 | 1 | Bit | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Bit Definition | Not Used                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Not Used                                                                                                                                                                                                                                                                                                                                                                                                     | Not Used | Datalink D     | Datalink C | Datalink B | Datalink A | Cmd/Ref    |            |            |            |         |         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |
| Default        | x                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | x                                                                                                                                                                                                                                                                                                                                                                                                            | x        | 0              | 0          | 0          | 0          | 1          |            |            |            |         |         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |
| Bit            | 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 6                                                                                                                                                                                                                                                                                                                                                                                                            | 5        | 4              | 3          | 2          | 1          | 0          |            |            |            |         |         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |
| 25             | <b>[Flt Cfg Logic]</b><br><br>Sets the Logic Command data that is sent to the drive if any of the following is true: <ul style="list-style-type: none"><li>• <b>Parameter 21 - [Comm Flt Action]</b> is set to “4” (Send Flt Cfg) and I/O communications are disrupted.</li><li>• <b>Parameter 22 - [Idle Flt Action]</b> is set to “4” (Send Flt Cfg) and the controller is idle.</li><li>• <b>Parameter 41 - [Peer Flt Action]</b> is set to “4” (Send Flt Cfg) and Peer I/O communications are disrupted.</li></ul> The bit definitions will depend on the product to which the adapter is connected. See <a href="#">Appendix D</a> or the documentation for the drive being used. | Default: 0000 0000 0000 0000<br>Minimum: 0000 0000 0000 0000<br>Maximum: 1111 1111 1111 1111<br>Type: Read/Write<br>Reset Required: No                                                                                                                                                                                                                                                                       |          |                |            |            |            |            |            |            |            |         |         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |
| 26             | <b>[Flt Cfg Ref]</b><br><br>Sets the Reference data that is sent to the drive if any of the following is true: <ul style="list-style-type: none"><li>• <b>Parameter 21 - [Comm Flt Action]</b> is set to “4” (Send Flt Cfg) and I/O communications are disrupted.</li><li>• <b>Parameter 22 - [Idle Flt Action]</b> is set to “4” (Send Flt Cfg) and the controller is idle.</li><li>• <b>Parameter 41 - [Peer Flt Action]</b> is set to “4” (Send Flt Cfg) and Peer I/O communications are disrupted.</li></ul>                                                                                                                                                                       | Default: 0<br>Minimum: 0<br>Maximum: 4294967295<br>Type: Read/Write<br>Reset Required: No<br><br><b>Important:</b> If the drive uses a 16-bit Reference, the most significant word of this value must be set to zero (0) or a fault will occur.                                                                                                                                                              |          |                |            |            |            |            |            |            |            |         |         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |
| 27             | <b>[Flt Cfg A1 In]</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Default: 0                                                                                                                                                                                                                                                                                                                                                                                                   |          |                |            |            |            |            |            |            |            |         |         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |
| 28             | <b>[Flt Cfg A2 In]</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Default: 0                                                                                                                                                                                                                                                                                                                                                                                                   |          |                |            |            |            |            |            |            |            |         |         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |
| 29             | <b>[Flt Cfg B1 In]</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Default: 0                                                                                                                                                                                                                                                                                                                                                                                                   |          |                |            |            |            |            |            |            |            |         |         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |
| 30             | <b>[Flt Cfg B2 In]</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Default: 0                                                                                                                                                                                                                                                                                                                                                                                                   |          |                |            |            |            |            |            |            |            |         |         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |
| 31             | <b>[Flt Cfg C1 In]</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Default: 0                                                                                                                                                                                                                                                                                                                                                                                                   |          |                |            |            |            |            |            |            |            |         |         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |
| 32             | <b>[Flt Cfg C2 In]</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Default: 0                                                                                                                                                                                                                                                                                                                                                                                                   |          |                |            |            |            |            |            |            |            |         |         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |
| 33             | <b>[Flt Cfg D1 In]</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Default: 0                                                                                                                                                                                                                                                                                                                                                                                                   |          |                |            |            |            |            |            |            |            |         |         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |
| 34             | <b>[Flt Cfg D2 In]</b><br><br>Sets the data that is sent to the Datalink in the drive if any of the following is true: <ul style="list-style-type: none"><li>• <b>Parameter 21 - [Comm Flt Action]</b> is set to “4” (Send Flt Cfg) and I/O communications are disrupted.</li><li>• <b>Parameter 22 - [Idle Flt Action]</b> is set to “4” (Send Flt Cfg) and the controller is idle.</li><li>• <b>Parameter 41 - [Peer Flt Action]</b> is set to “4” (Send Flt Cfg) and Peer I/O communications are disrupted.</li></ul>                                                                                                                                                               | Default: 0<br>Minimum: 0<br>Maximum: 4294967295<br>Type: Read/Write<br>Reset Required: No<br><br><b>Important:</b> If the drive uses 16-bit Datalinks, the most significant word of this value must be set to zero (0) or a fault will occur.                                                                                                                                                                |          |                |            |            |            |            |            |            |            |         |         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |

| Parameter      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                |                   |                   |                   |                   |                   |                   |                   |         |         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|---------|---------|---|---|---|---|---|---|---|---|-----|---|---|---|---|---|---|---|---|
| No.            | Name and Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Details                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                |                   |                   |                   |                   |                   |                   |                   |         |         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |
| 35             | <b>[M-S Input]</b><br><br>Sets the Master-Slave input data. This data is produced by the scanner and consumed by the adapter.                                                                                                                                                                                                                                                                                                                                                                                                                     | Default: xxx0 0001<br>Bit Values: 0 = I/O disabled<br>1 = I/O enabled<br>Type: Read/Write<br>Reset Required: Yes<br><br><table><tr><th>Bit Definition</th><th>Not Used</th><th>Not Used</th><th>Not Used</th><th>Datalink D Input</th><th>Datalink C Input</th><th>Datalink B Input</th><th>Datalink A Input</th><th>Cmd/Ref</th></tr><tr><td>Default</td><td>x</td><td>x</td><td>x</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td></tr><tr><td>Bit</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr></table>     | Bit Definition | Not Used          | Not Used          | Not Used          | Datalink D Input  | Datalink C Input  | Datalink B Input  | Datalink A Input  | Cmd/Ref | Default | x | x | x | 0 | 0 | 0 | 0 | 1 | Bit | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Bit Definition | Not Used                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Not Used                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Not Used       | Datalink D Input  | Datalink C Input  | Datalink B Input  | Datalink A Input  | Cmd/Ref           |                   |                   |         |         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |
| Default        | x                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | x                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | x              | 0                 | 0                 | 0                 | 0                 | 1                 |                   |                   |         |         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |
| Bit            | 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 5              | 4                 | 3                 | 2                 | 1                 | 0                 |                   |                   |         |         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |
| 36             | <b>[M-S Output]</b><br><br>Sets the Master-Slave output data. This data is produced by the adapter and consumed by the Master device (for example, scanner).                                                                                                                                                                                                                                                                                                                                                                                      | Default: xxx0 0001<br>Bit Values: 0 = I/O disabled<br>1 = I/O enabled<br>Type: Read/Write<br>Reset Required: Yes<br><br><table><tr><th>Bit Definition</th><th>Not Used</th><th>Not Used</th><th>Not Used</th><th>Datalink D Output</th><th>Datalink C Output</th><th>Datalink B Output</th><th>Datalink A Output</th><th>Cmd/Ref</th></tr><tr><td>Default</td><td>x</td><td>x</td><td>x</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td></tr><tr><td>Bit</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr></table> | Bit Definition | Not Used          | Not Used          | Not Used          | Datalink D Output | Datalink C Output | Datalink B Output | Datalink A Output | Cmd/Ref | Default | x | x | x | 0 | 0 | 0 | 0 | 1 | Bit | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Bit Definition | Not Used                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Not Used                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Not Used       | Datalink D Output | Datalink C Output | Datalink B Output | Datalink A Output | Cmd/Ref           |                   |                   |         |         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |
| Default        | x                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | x                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | x              | 0                 | 0                 | 0                 | 0                 | 1                 |                   |                   |         |         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |
| Bit            | 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 5              | 4                 | 3                 | 2                 | 1                 | 0                 |                   |                   |         |         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |
| 37             | <b>[Ref Adjust]</b><br><br>Sets the percent scale factor for the Reference received from the network.                                                                                                                                                                                                                                                                                                                                                                                                                                             | Default: 100.00%<br>Minimum: 0.00%<br>Maximum: 200.00%<br>Type: Read/Write<br>Reset Required: No<br><br><div><b>ATTENTION:</b> To guard against equipment damage and/or personal injury, note that changes to <b>Parameter 37 - [Ref Adjust]</b> take effect immediately. A drive receiving its Reference from the adapter will receive the newly scaled Reference, resulting in a change of speed.</div>                                                                     |                |                   |                   |                   |                   |                   |                   |                   |         |         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |
| 38             | <b>[Peer A Input]</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Default: 0 = Off                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                |                   |                   |                   |                   |                   |                   |                   |         |         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |
| 39             | <b>[Peer B Input]</b><br><br>Sets the destination of the Peer I/O input. The adapter receives this data from the network and sends it to the drive.<br><br><b>Important:</b> Changes to these parameters are ignored when <b>Parameter 47 - [Peer Inp Enable]</b> is "1" (On).<br><br><b>Important:</b> If the parameter is set to input a Logic Command, configure the mask in <b>Parameter 40 - [Peer Cmd Mask]</b> so that the desired bits from the Peer device are used.                                                                     | Default: 0 = Off<br>Default: 0 = Off<br>Values: 0 = Off<br>1 = Cmd/Ref<br>2 = Datalink A Input<br>3 = Datalink B Input<br>4 = Datalink C Input<br>5 = Datalink D Input<br>Type: Read/Write<br>Reset Required: No                                                                                                                                                                                                                                                                                                                                                 |                |                   |                   |                   |                   |                   |                   |                   |         |         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |
| 40             | <b>[Peer Cmd Mask]</b><br><br>Sets the mask for the Logic Command word when it is received through peer input. If the mask bit is "0" (Off), the command bit is ignored and not used. If the mask bit is "1" (On), the command bit is checked and used.<br><br><b>Important:</b> If the adapter receives a Logic Command from both a Master device and a Peer device, each command bit must have only one source. The source of command bits set to "0" will be the Master device. The source of command bits set to "1" will be the Peer device. | Default: 0000 0000 0000 0000<br>Minimum: 0000 0000 0000 0000<br>Maximum: 1111 1111 1111 1111<br>Values: 0 = Ignore bit<br>1 = Check bit<br>Type: Read/Write<br>Reset Required: Yes                                                                                                                                                                                                                                                                                                                                                                               |                |                   |                   |                   |                   |                   |                   |                   |         |         |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |

| Parameter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                     |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|--|
| No.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Name and Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Details                                                                                                                                             |  |
| 41                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>[Peer Flt Action]</b><br>Sets the action that the adapter and drive will take if the adapter detects that Peer I/O communications have been disrupted. This setting is effective only if I/O is transmitted through the adapter.                                                                                                                                                                                                                                                                                                                                                                                       | Default: 0 = Fault<br>Values: 0 = Fault<br>1 = Stop<br>2 = Zero Data<br>3 = Hold Last<br>4 = Send Flt Cfg<br>Type: Read/Write<br>Reset Required: No |  |
|  <b>ATTENTION:</b> Risk of injury or equipment damage exists. <b>Parameter 41 - [Peer Flt Action]</b> lets you determine the action of the adapter and connected drive if the adapter is unable to communicate with the designated peer. By default, this parameter faults the drive. You can set this parameter so that the drive continues to run. Precautions should be taken to ensure that the setting of this parameter does not create a risk of injury or equipment damage. When commissioning the drive, verify that your system responds correctly to various situations (for example, a disconnected cable). |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                     |  |
| 42                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>[Peer Inp Addr 1]</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Default: 0                                                                                                                                          |  |
| 43                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>[Peer Inp Addr 2]</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Default: 0                                                                                                                                          |  |
| 44                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>[Peer Inp Addr 3]</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Default: 0                                                                                                                                          |  |
| 45                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>[Peer Inp Addr 4]</b><br>Sets the bytes in the IP address that specifies the device from which the adapter receives (consumes) Peer I/O data.<br><div style="text-align: center;"> 255 . 255 . 255 . 255<br/>                             <br/> [Peer Inp Addr 1]<br/> [Peer Inp Addr 2]<br/> [Peer Inp Addr 3]<br/> [Peer Inp Addr 4] </div> <p><b>Important:</b> The Peer Inp Addr must be on the same subnet as the 20-COMM-E. Refer to <a href="#">IP Addresses on page G-5</a> for more information.</p> <p>Changes to these parameters are ignored when <b>Parameter 47 - [Peer Inp Enable]</b> is "1" (On).</p> | Default: 0<br>Minimum: 0<br>Maximum: 255<br>Type: Read/Write<br>Reset Required: No                                                                  |  |
| 46                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>[Peer Inp Timeout]</b><br>Sets the time-out for a Peer I/O connection. If the time is reached without the adapter receiving (consuming) a message, the adapter will respond with the action specified in <b>Parameter 41 - [Peer Flt Action]</b> .<br>In an adapter receiving (consuming) Peer I/O, the value of this parameter must be greater than the product of the value of <b>Parameter 52 - [Peer Out Time]</b> in the adapter transmitting (producing) Peer I/O multiplied by the value of <b>Parameter 53 - [Peer Out Skip]</b> in the adapter transmitting (producing) Peer I/O.                             | Default: 10.00 Seconds<br>Minimum: 0.01 Seconds<br>Maximum: 10.00 Seconds<br>Type: Read/Write<br>Reset Required: No                                 |  |
| 47                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>[Peer Inp Enable]</b><br>Determines if Peer I/O input is on or off.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Default: 0 = Off<br>Values: 0 = Off<br>1 = On<br>Type: Read/Write<br>Reset Required: No                                                             |  |
| 48                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>[Peer Inp Status]</b><br>Displays the status of the consumed Peer I/O input connection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Default: 0 = Off<br>Values: 0 = Off<br>1 = Waiting<br>2 = Running<br>3 = Faulted<br>Type: Read Only                                                 |  |

| Parameter      |                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                       |                |          |          |          |          |          |          |          |               |            |          |          |               |            |         |   |   |   |   |     |   |   |   |   |   |   |   |   |     |    |    |    |    |     |   |   |   |   |   |   |   |   |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|----------------|----------|----------|----------|----------|----------|----------|----------|---------------|------------|----------|----------|---------------|------------|---------|---|---|---|---|-----|---|---|---|---|---|---|---|---|-----|----|----|----|----|-----|---|---|---|---|---|---|---|---|
| No.            | Name and Description                                                                                                                                                                               | Details                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                       |                |          |          |          |          |          |          |          |               |            |          |          |               |            |         |   |   |   |   |     |   |   |   |   |   |   |   |   |     |    |    |    |    |     |   |   |   |   |   |   |   |   |
| 49             | [Peer A Output]                                                                                                                                                                                    | Default:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 0 = Off               |                |          |          |          |          |          |          |          |               |            |          |          |               |            |         |   |   |   |   |     |   |   |   |   |   |   |   |   |     |    |    |    |    |     |   |   |   |   |   |   |   |   |
| 50             | [Peer B Output]                                                                                                                                                                                    | Default:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 0 = Off               |                |          |          |          |          |          |          |          |               |            |          |          |               |            |         |   |   |   |   |     |   |   |   |   |   |   |   |   |     |    |    |    |    |     |   |   |   |   |   |   |   |   |
|                | Selects the source of the Peer I/O output data. The adapter transmits this data to the network.                                                                                                    | Values:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0 = Off               |                |          |          |          |          |          |          |          |               |            |          |          |               |            |         |   |   |   |   |     |   |   |   |   |   |   |   |   |     |    |    |    |    |     |   |   |   |   |   |   |   |   |
|                | <b>Important:</b> Changes to these parameters are ignored when <b>Parameter 51 - [Peer Out Enable]</b> is “1” (On).                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1 = Cmd/Ref           |                |          |          |          |          |          |          |          |               |            |          |          |               |            |         |   |   |   |   |     |   |   |   |   |   |   |   |   |     |    |    |    |    |     |   |   |   |   |   |   |   |   |
|                |                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 2 = Datalink A Input  |                |          |          |          |          |          |          |          |               |            |          |          |               |            |         |   |   |   |   |     |   |   |   |   |   |   |   |   |     |    |    |    |    |     |   |   |   |   |   |   |   |   |
|                |                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 3 = Datalink B Input  |                |          |          |          |          |          |          |          |               |            |          |          |               |            |         |   |   |   |   |     |   |   |   |   |   |   |   |   |     |    |    |    |    |     |   |   |   |   |   |   |   |   |
|                |                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 4 = Datalink C Input  |                |          |          |          |          |          |          |          |               |            |          |          |               |            |         |   |   |   |   |     |   |   |   |   |   |   |   |   |     |    |    |    |    |     |   |   |   |   |   |   |   |   |
|                |                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 5 = Datalink D Input  |                |          |          |          |          |          |          |          |               |            |          |          |               |            |         |   |   |   |   |     |   |   |   |   |   |   |   |   |     |    |    |    |    |     |   |   |   |   |   |   |   |   |
|                |                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 6 = Datalink A Output |                |          |          |          |          |          |          |          |               |            |          |          |               |            |         |   |   |   |   |     |   |   |   |   |   |   |   |   |     |    |    |    |    |     |   |   |   |   |   |   |   |   |
|                |                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 7 = Datalink B Output |                |          |          |          |          |          |          |          |               |            |          |          |               |            |         |   |   |   |   |     |   |   |   |   |   |   |   |   |     |    |    |    |    |     |   |   |   |   |   |   |   |   |
|                |                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 8 = Datalink C Output |                |          |          |          |          |          |          |          |               |            |          |          |               |            |         |   |   |   |   |     |   |   |   |   |   |   |   |   |     |    |    |    |    |     |   |   |   |   |   |   |   |   |
|                |                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 9 = Datalink D Output |                |          |          |          |          |          |          |          |               |            |          |          |               |            |         |   |   |   |   |     |   |   |   |   |   |   |   |   |     |    |    |    |    |     |   |   |   |   |   |   |   |   |
|                |                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Type:                 | Read/Write     |          |          |          |          |          |          |          |               |            |          |          |               |            |         |   |   |   |   |     |   |   |   |   |   |   |   |   |     |    |    |    |    |     |   |   |   |   |   |   |   |   |
|                |                                                                                                                                                                                                    | Reset Required:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | No                    |                |          |          |          |          |          |          |          |               |            |          |          |               |            |         |   |   |   |   |     |   |   |   |   |   |   |   |   |     |    |    |    |    |     |   |   |   |   |   |   |   |   |
| 51             | [Peer Out Enable]                                                                                                                                                                                  | Default:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 0 = Off               |                |          |          |          |          |          |          |          |               |            |          |          |               |            |         |   |   |   |   |     |   |   |   |   |   |   |   |   |     |    |    |    |    |     |   |   |   |   |   |   |   |   |
|                | Determines if Peer I/O output is on or off.                                                                                                                                                        | Values:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0 = Off               |                |          |          |          |          |          |          |          |               |            |          |          |               |            |         |   |   |   |   |     |   |   |   |   |   |   |   |   |     |    |    |    |    |     |   |   |   |   |   |   |   |   |
|                |                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1 = On                |                |          |          |          |          |          |          |          |               |            |          |          |               |            |         |   |   |   |   |     |   |   |   |   |   |   |   |   |     |    |    |    |    |     |   |   |   |   |   |   |   |   |
|                |                                                                                                                                                                                                    | Type:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Read/Write            |                |          |          |          |          |          |          |          |               |            |          |          |               |            |         |   |   |   |   |     |   |   |   |   |   |   |   |   |     |    |    |    |    |     |   |   |   |   |   |   |   |   |
|                |                                                                                                                                                                                                    | Reset Required:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | No                    |                |          |          |          |          |          |          |          |               |            |          |          |               |            |         |   |   |   |   |     |   |   |   |   |   |   |   |   |     |    |    |    |    |     |   |   |   |   |   |   |   |   |
| 52             | [Peer Out Time]                                                                                                                                                                                    | Default:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 10.00 Seconds         |                |          |          |          |          |          |          |          |               |            |          |          |               |            |         |   |   |   |   |     |   |   |   |   |   |   |   |   |     |    |    |    |    |     |   |   |   |   |   |   |   |   |
|                | Sets the minimum time that an adapter will wait when transmitting data to a peer.                                                                                                                  | Minimum:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 0.01 Seconds          |                |          |          |          |          |          |          |          |               |            |          |          |               |            |         |   |   |   |   |     |   |   |   |   |   |   |   |   |     |    |    |    |    |     |   |   |   |   |   |   |   |   |
|                | <b>Important:</b> Changes to these parameters are ignored when <b>Parameter 51 - [Peer Out Enable]</b> is “1” (On).                                                                                | Maximum:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 10.00 Seconds         |                |          |          |          |          |          |          |          |               |            |          |          |               |            |         |   |   |   |   |     |   |   |   |   |   |   |   |   |     |    |    |    |    |     |   |   |   |   |   |   |   |   |
|                |                                                                                                                                                                                                    | Type:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Read/Write            |                |          |          |          |          |          |          |          |               |            |          |          |               |            |         |   |   |   |   |     |   |   |   |   |   |   |   |   |     |    |    |    |    |     |   |   |   |   |   |   |   |   |
|                |                                                                                                                                                                                                    | Reset Required:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | No                    |                |          |          |          |          |          |          |          |               |            |          |          |               |            |         |   |   |   |   |     |   |   |   |   |   |   |   |   |     |    |    |    |    |     |   |   |   |   |   |   |   |   |
| 53             | [Peer Out Skip]                                                                                                                                                                                    | Default:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 1                     |                |          |          |          |          |          |          |          |               |            |          |          |               |            |         |   |   |   |   |     |   |   |   |   |   |   |   |   |     |    |    |    |    |     |   |   |   |   |   |   |   |   |
|                | Sets the maximum time that an adapter will wait when transmitting data to a peer. The value of <b>Parameter 52 - [Peer Out Time]</b> is multiplied by the value of this parameter to set the time. | Minimum:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 1                     |                |          |          |          |          |          |          |          |               |            |          |          |               |            |         |   |   |   |   |     |   |   |   |   |   |   |   |   |     |    |    |    |    |     |   |   |   |   |   |   |   |   |
|                | <b>Important:</b> Changes to these parameters are ignored when <b>Parameter 51 - [Peer Out Enable]</b> is “1” (On).                                                                                | Maximum:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 16                    |                |          |          |          |          |          |          |          |               |            |          |          |               |            |         |   |   |   |   |     |   |   |   |   |   |   |   |   |     |    |    |    |    |     |   |   |   |   |   |   |   |   |
|                |                                                                                                                                                                                                    | Type:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Read/Write            |                |          |          |          |          |          |          |          |               |            |          |          |               |            |         |   |   |   |   |     |   |   |   |   |   |   |   |   |     |    |    |    |    |     |   |   |   |   |   |   |   |   |
|                |                                                                                                                                                                                                    | Reset Required:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | No                    |                |          |          |          |          |          |          |          |               |            |          |          |               |            |         |   |   |   |   |     |   |   |   |   |   |   |   |   |     |    |    |    |    |     |   |   |   |   |   |   |   |   |
| 54             | [Access Control]                                                                                                                                                                                   | Default:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | xxxx xx01             |                |          |          |          |          |          |          |          |               |            |          |          |               |            |         |   |   |   |   |     |   |   |   |   |   |   |   |   |     |    |    |    |    |     |   |   |   |   |   |   |   |   |
|                | This parameter is only available for Series A (version 2.003 or earlier) adapters.                                                                                                                 | Bit Values:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 0 = Disabled          |                |          |          |          |          |          |          |          |               |            |          |          |               |            |         |   |   |   |   |     |   |   |   |   |   |   |   |   |     |    |    |    |    |     |   |   |   |   |   |   |   |   |
|                | Sets the access to the Web interface and Web-configurable e-mail notification feature.                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1 = Enabled           |                |          |          |          |          |          |          |          |               |            |          |          |               |            |         |   |   |   |   |     |   |   |   |   |   |   |   |   |     |    |    |    |    |     |   |   |   |   |   |   |   |   |
|                |                                                                                                                                                                                                    | Type:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Read/Write            |                |          |          |          |          |          |          |          |               |            |          |          |               |            |         |   |   |   |   |     |   |   |   |   |   |   |   |   |     |    |    |    |    |     |   |   |   |   |   |   |   |   |
|                |                                                                                                                                                                                                    | Reset Required:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | No                    |                |          |          |          |          |          |          |          |               |            |          |          |               |            |         |   |   |   |   |     |   |   |   |   |   |   |   |   |     |    |    |    |    |     |   |   |   |   |   |   |   |   |
|                |                                                                                                                                                                                                    | <table><tr><th>Bit Definition</th><th>Not Used</th><th>Not Used</th><th>Not Used</th><th>Not Used</th><th>...</th><th>Not Used</th><th>Not Used</th><th>Not Used</th><th>Not Used</th><th>Not Used</th><th>Not Used</th><th>E-mail Config</th><th>Web Enable</th></tr><tr><td>Default</td><td>x</td><td>x</td><td>x</td><td>x</td><td>...</td><td>x</td><td>x</td><td>x</td><td>x</td><td>x</td><td>x</td><td>0</td><td>1</td></tr><tr><td>Bit</td><td>31</td><td>30</td><td>29</td><td>28</td><td>...</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr></table> |                       | Bit Definition | Not Used | Not Used | Not Used | Not Used | ...      | Not Used | Not Used | Not Used      | Not Used   | Not Used | Not Used | E-mail Config | Web Enable | Default | x | x | x | x | ... | x | x | x | x | x | x | 0 | 1 | Bit | 31 | 30 | 29 | 28 | ... | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Bit Definition | Not Used                                                                                                                                                                                           | Not Used                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Not Used              | Not Used       | ...      | Not Used | Not Used | Not Used | Not Used | Not Used | Not Used | E-mail Config | Web Enable |          |          |               |            |         |   |   |   |   |     |   |   |   |   |   |   |   |   |     |    |    |    |    |     |   |   |   |   |   |   |   |   |
| Default        | x                                                                                                                                                                                                  | x                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | x                     | x              | ...      | x        | x        | x        | x        | x        | x        | 0             | 1          |          |          |               |            |         |   |   |   |   |     |   |   |   |   |   |   |   |   |     |    |    |    |    |     |   |   |   |   |   |   |   |   |
| Bit            | 31                                                                                                                                                                                                 | 30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 29                    | 28             | ...      | 7        | 6        | 5        | 4        | 3        | 2        | 1             | 0          |          |          |               |            |         |   |   |   |   |     |   |   |   |   |   |   |   |   |     |    |    |    |    |     |   |   |   |   |   |   |   |   |
| 55             | [Web Enable]                                                                                                                                                                                       | Default:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 0 = Disabled          |                |          |          |          |          |          |          |          |               |            |          |          |               |            |         |   |   |   |   |     |   |   |   |   |   |   |   |   |     |    |    |    |    |     |   |   |   |   |   |   |   |   |
|                | This parameter is only available for Series B (version 3.xxx or later) adapters.                                                                                                                   | Values:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0 = Disabled          |                |          |          |          |          |          |          |          |               |            |          |          |               |            |         |   |   |   |   |     |   |   |   |   |   |   |   |   |     |    |    |    |    |     |   |   |   |   |   |   |   |   |
|                | Displays the setting of the adapter Web Pages Switch (SW2) when the adapter was last reset.                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1 = Enabled           |                |          |          |          |          |          |          |          |               |            |          |          |               |            |         |   |   |   |   |     |   |   |   |   |   |   |   |   |     |    |    |    |    |     |   |   |   |   |   |   |   |   |
|                |                                                                                                                                                                                                    | Type:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Read Only             |                |          |          |          |          |          |          |          |               |            |          |          |               |            |         |   |   |   |   |     |   |   |   |   |   |   |   |   |     |    |    |    |    |     |   |   |   |   |   |   |   |   |



## EtherNet/IP Objects

Appendix C presents information about the EtherNet/IP objects that can be accessed using Explicit Messages. For information on the format of Explicit Messages and example ladder logic programs, refer to [Chapter 6, Using Explicit Messaging](#).

| Object                                                | Class Code |      | Page                 |
|-------------------------------------------------------|------------|------|----------------------|
|                                                       | Hex.       | Dec. |                      |
| <a href="#">Identity Object</a>                       | 0x01       | 1    | <a href="#">C-2</a>  |
| <a href="#">Assembly Object</a>                       | 0x04       | 4    | <a href="#">C-3</a>  |
| <a href="#">Register Object</a>                       | 0x07       | 7    | <a href="#">C-4</a>  |
| <a href="#">Parameter Object</a> <sup>(1)</sup>       | 0x0F       | 15   | <a href="#">C-5</a>  |
| <a href="#">Parameter Group Object</a> <sup>(1)</sup> | 0x10       | 16   | <a href="#">C-7</a>  |
| <a href="#">PCCC Object</a>                           | 0x67       | 103  | <a href="#">C-8</a>  |
| <a href="#">DPI Device Object</a>                     | 0x92       | 146  | <a href="#">C-13</a> |
| <a href="#">DPI Parameter Object</a>                  | 0x93       | 147  | <a href="#">C-16</a> |

| Object                                                   | Class Code |      | Page                 |
|----------------------------------------------------------|------------|------|----------------------|
|                                                          | Hex.       | Dec. |                      |
| <a href="#">DPI Fault Object</a>                         | 0x97       | 151  | <a href="#">C-22</a> |
| <a href="#">DPI Alarm Object</a>                         | 0x98       | 152  | <a href="#">C-24</a> |
| <a href="#">DPI Diagnostic Object</a>                    | 0x99       | 153  | <a href="#">C-26</a> |
| <a href="#">DPI Time Object</a>                          | 0x9B       | 155  | <a href="#">C-28</a> |
| <a href="#">Host DPI Parameter Object</a> <sup>(2)</sup> | 0x9F       | 159  | <a href="#">C-30</a> |
| <a href="#">TCP/IP Interface Object</a>                  | 0xF5       | 245  | <a href="#">C-36</a> |
| <a href="#">Ethernet Link Object</a>                     | 0xF6       | 246  | <a href="#">C-37</a> |

<sup>(1)</sup> These objects are NOT supported when the adapter is used with a PowerFlex 750-Series drive.

<sup>(2)</sup> This object is supported only when the adapter is used with a PowerFlex 750-Series drive.



**TIP:** Refer to the EtherNet/IP specification for more information about EtherNet/IP objects. Information about the EtherNet/IP specification is available on the ODVA web site (<http://www.odva.org>).

### Supported Data Types

| Data Type    | Description                                           |
|--------------|-------------------------------------------------------|
| BOOL         | 8-bit value -- low bit is true or false               |
| BOOL[n]      | Array of n bits                                       |
| BYTE         | 8-bit unsigned integer                                |
| CONTAINER    | 32-bit parameter value - sign extended if necessary   |
| DINT         | 32-bit signed integer                                 |
| DWORD        | 32-bit unsigned integer                               |
| INT          | 16-bit signed integer                                 |
| LWORD        | 64-bit unsigned integer                               |
| REAL         | 32-bit floating point                                 |
| SHORT_STRING | 1-byte length indicator + that many characters        |
| SINT         | 8-bit signed integer                                  |
| STRING[n]    | Array of n characters                                 |
| STRUCT       | Structure name only - no size in addition to elements |
| TCHAR        | 8 or 16-bit character                                 |
| UDINT        | 32-bit unsigned integer                               |
| UINT         | 16-bit unsigned integer                               |
| USINT        | 8-bit unsigned integer                                |
| WORD         | 16-bit unsigned integer                               |

## Identity Object

### Class Code

| Hexadecimal | Decimal |
|-------------|---------|
| 0x01        | 1       |

### Services

| Service Code | Implemented for: |          | Service Name         |
|--------------|------------------|----------|----------------------|
|              | Class            | Instance |                      |
| 0x05         | No               | Yes      | Reset                |
| 0x0E         | Yes              | Yes      | Get_Attribute_Single |
| 0x01         | Yes              | Yes      | Get_Attributes_All   |

### Instances

The number of instances depends on the number of components in the device connected to the adapter. This number of components can be read in Instance 0, Attribute 2.

| Instance | Description                 |
|----------|-----------------------------|
| 0        | Class                       |
| 1        | Host                        |
| 2...15   | Peripherals on Ports 1...14 |

### Class Attributes

| Attribute ID | Access Rule | Name         | Data Type | Description               |
|--------------|-------------|--------------|-----------|---------------------------|
| 2            | Get         | Max Instance | WORD      | Total number of instances |

### Instance Attributes

| Attribute ID | Access Rule | Name                        | Data Type                  | Description                                                                          |
|--------------|-------------|-----------------------------|----------------------------|--------------------------------------------------------------------------------------|
| 1            | Get         | Vendor ID                   | WORD                       | 1 = Allen-Bradley                                                                    |
| 2            | Get         | Device Type                 | WORD                       | 123                                                                                  |
| 3            | Get         | Product Code                | WORD                       | Number identifying product name and rating                                           |
| 4            | Get         | Revision:<br>Major<br>Minor | STRUCT of:<br>BYTE<br>BYTE | Value varies<br>Value varies                                                         |
| 5            | Get         | Status                      | WORD                       | Bit 0 = Owned<br>Bit 8 = Minor recoverable fault<br>Bit 10 = Major recoverable fault |
| 6            | Get         | Serial Number               | DWORD                      | Unique 32-bit number                                                                 |
| 7            | Get         | Product Name                | SHORT_STRING               | Product name and rating                                                              |

## Assembly Object

### Class Code

| Hexadecimal | Decimal |
|-------------|---------|
| 0x04        | 4       |

### Services

| Service Code | Implemented for: |          | Service Name         |
|--------------|------------------|----------|----------------------|
|              | Class            | Instance |                      |
| 0x0E         | Yes              | Yes      | Get_Attribute_Single |
| 0x10         | Yes              | Yes      | Set_Attribute_Single |

### Instances

| Instance | Description                                             |
|----------|---------------------------------------------------------|
| 1        | All I/O data being read from the DPI device (read-only) |
| 2        | All I/O data written to the DPI device (read/write)     |

### Class Attributes

| Attribute ID | Access Rule | Name            | Data Type | Description                |
|--------------|-------------|-----------------|-----------|----------------------------|
| 1            | Get         | Revision        | WORD      | 2                          |
| 2            | Get         | Max Instance    | WORD      | 2                          |
| 100          | Set         | Control Timeout | WORD      | Control timeout in seconds |

### Instance Attributes

| Attribute ID | Access Rule                | Name              | Data Type                                        | Description                                               |
|--------------|----------------------------|-------------------|--------------------------------------------------|-----------------------------------------------------------|
| 1            | Get                        | Number of Members | WORD                                             | 1                                                         |
| 2            | Get                        | Member List       | ARRAY of STRUCT:<br>WORD<br>WORD<br>Packed EPATH | Size of member data<br>Size of member path<br>Member path |
| 3            | Conditional <sup>(1)</sup> | Data              | Array of Bits                                    | Data to be transferred                                    |
| 4            | Get                        | Size              | WORD                                             | Size of assembly data in bits                             |

<sup>(1)</sup> For instance 1, access rule for the data attribute is Get. For instance 2, it is Get/Set.

**Important:** Setting an assembly object attribute can be done only when the Control Timeout (class attribute 100) has been set to a non-zero value.

## Register Object

### Class Code

| Hexadecimal | Decimal |
|-------------|---------|
| 0x07        | 7       |

### Services

| Service Code | Implemented for: |          | Service Name         |
|--------------|------------------|----------|----------------------|
|              | Class            | Instance |                      |
| 0x0E         | Yes              | Yes      | Get_Attribute_Single |
| 0x10         | Yes              | Yes      | Set_Attribute_Single |

### Instances

| Instance | Description                                                  |
|----------|--------------------------------------------------------------|
| 1        | All I/O data being read from the DPI device (read-only)      |
| 2        | All I/O data written to the DPI device (read/write)          |
| 3        | Logic Status and Feedback data (read-only)                   |
| 4        | Logic Command and Reference data (read/write)                |
| 5        | Datalink A (input data from device to scanner) (read only)   |
| 6        | Datalink A (output data from scanner to device) (read/write) |
| 7        | Datalink B (input data from device to scanner) (read only)   |
| 8        | Datalink B (output data from scanner to device) (read/write) |
| 9        | Datalink C (input data from device to scanner) (read only)   |
| 10       | Datalink C (output data from scanner to device) (read/write) |
| 11       | Datalink D (input data from device to scanner) (read only)   |
| 12       | Datalink D (output data from scanner to device) (read/write) |
| 13       | Logic Status and Feedback Data (read-only)                   |
| 14       | Mask <sup>(1)</sup> (read/write)                             |
| 15       | Logic Status (read-only)                                     |
| 16       | Logic Command (read/write)                                   |
| 17       | Feedback (read-only)                                         |
| 18       | Reference (read/write)                                       |

<sup>(1)</sup> The mask command word is set to the value of the first word of the data where there are ones in the second word of the data. Command = (word 1 and not word 2) or (word 1 and word 2). This only controls specified bits in the Logic Command data to the DPI product and does not change the Reference value.

### Class Attributes

| Attribute ID | Access Rule | Name            | Data Type | Description                |
|--------------|-------------|-----------------|-----------|----------------------------|
| 100          | Set         | Control Timeout | WORD      | Control timeout in seconds |

### Instance Attributes

| Attribute ID | Access Rule                | Name      | Data Type     | Description                                                                                                        |
|--------------|----------------------------|-----------|---------------|--------------------------------------------------------------------------------------------------------------------|
| 1            | Get                        | Bad Flag  | BOOL          | If set to 1, then attribute 4 may contain invalid data.<br>0 = good<br>1 = bad                                     |
| 2            | Get                        | Direction | BOOL          | Direction of data transfer<br>0 = Producer Register (drive to network)<br>1 = Consumer Register (network to drive) |
| 3            | Get                        | Size      | WORD          | Size of register data in bits                                                                                      |
| 4            | Conditional <sup>(1)</sup> | Data      | ARRAY of BITS | Data to be transferred                                                                                             |

<sup>(1)</sup> For this attribute, the Access Rule is Get if Direction = 0. The Access Rule is Set if Direction = 1.

**Important:** Setting a Register object attribute can be done only when the Control Timeout (class attribute 100) has been set to a non-zero value.

## Parameter Object

### Class Code

| Hexadecimal | Decimal |
|-------------|---------|
| 0x0F        | 15      |

**Important:** This object is not supported when the adapter is used with a PowerFlex 750-Series drive.

### Services

| Service Code | Implemented for: |          | Service Name         |
|--------------|------------------|----------|----------------------|
|              | Class            | Instance |                      |
| 0x01         | Yes              | Yes      | Get_Attributes_All   |
| 0x05         | Yes              | No       | Reset                |
| 0x0E         | Yes              | Yes      | Get_Attribute_Single |
| 0x10         | Yes              | Yes      | Set_Attribute_Single |
| 0x4B         | No               | Yes      | Get_Enum_String      |

### Instances

The number of instances depends on the number of parameters in the DPI drive. The adapter parameters are appended to the list of drive parameters. The total number of parameters can be read in Instance 0, Attribute 2.

| Instance | Description                                        |
|----------|----------------------------------------------------|
| 0        | Class Attributes                                   |
| 1        | Drive Parameter 1 Attributes                       |
| ⋮        | ⋮                                                  |
| n        | Last Drive Parameter n Attributes <sup>(1)</sup>   |
| n + 1    | Adapter Parameter 1 Attributes                     |
| ⋮        | ⋮                                                  |
| n + m    | Last Adapter Parameter m Attributes <sup>(2)</sup> |

<sup>(1)</sup> n represents the number of parameters in the drive.

<sup>(2)</sup> m represents the number of parameters in the adapter.

### Class Attributes

| Attribute ID | Access Rule | Name                            | Data Type | Description                                                                                                                                                                 |
|--------------|-------------|---------------------------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1            | Get         | Revision                        | WORD      | 1                                                                                                                                                                           |
| 2            | Get         | Max Instance                    | WORD      | Number of parameters                                                                                                                                                        |
| 8            | Get         | Parameter Class Descriptor      | WORD      | 0 = False, 1 = True<br>Bit 0 = Supports parameter instances<br>Bit 1 = Supports full attributes<br>Bit 2 = Must do NVS save command<br>Bit 3 = Parameters are stored in NVS |
| 9            | Get         | Configuration Assembly Instance | WORD      | 0                                                                                                                                                                           |
| 10           | Set         | Native Language                 | BYTE      | 0 = English<br>1 = French<br>2 = Spanish<br>3 = Italian<br>4 = German<br>5 = Japanese<br>6 = Portuguese<br>7 = Mandarin Chinese<br>8 = Russian<br>9 = Dutch                 |

### Instance Attributes

| Attribute ID | Access Rule | Name                  | Data Type    | Description                                                                                                                                                                               |
|--------------|-------------|-----------------------|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1            | (1)         | Parameter Value       | (2)          | (3)                                                                                                                                                                                       |
| 2            | Get         | Link Path Size        | BYTE         | 0 = No link specified<br>n = The size of Attribute 3 in bytes                                                                                                                             |
| 3            | Get         | Link Path             |              | (4)                                                                                                                                                                                       |
| 4            | Get         | Descriptor            | WORD         | 0 = False, 1 = True<br>Bit 1 = Supports ENUMs<br>Bit 2 = Supports scaling<br>Bit 3 = Supports scaling links<br>Bit 4 = Read only<br>Bit 5 = Monitor<br>Bit 6 = Extended precision scaling |
| 5            | Get         | Data Type             | BYTE         | 1 = WORD (16-bit)<br>2 = UINT (16-bit)<br>3 = INT (16-bit)<br>5 = SINT<br>6 = DINT<br>8 = USINT<br>9 = UDINT<br>11 = REAL<br>22 = SHORT_STRING<br>24 = BYTE<br>25 = DWORD                 |
| 6            | Get         | Data Size             | BYTE         | (3)                                                                                                                                                                                       |
| 7            | Get         | Parameter Name String | SHORT_STRING | (3)                                                                                                                                                                                       |
| 8            | Get         | Units String          | SHORT_STRING | (3)                                                                                                                                                                                       |
| 9            | Get         | Help String           | SHORT_STRING | Null string                                                                                                                                                                               |
| 10           | Get         | Minimum Value         | (2)          | (3)                                                                                                                                                                                       |
| 11           | Get         | Maximum Value         | (2)          | (3)                                                                                                                                                                                       |
| 12           | Get         | Default Value         | (2)          | (3)                                                                                                                                                                                       |
| 13           | Get         | Scaling Multiplier    | WORD         | (3)                                                                                                                                                                                       |
| 14           | Get         | Scaling Divisor       | WORD         | (3)                                                                                                                                                                                       |
| 15           | Get         | Scaling Base          | WORD         | (3)                                                                                                                                                                                       |
| 16           | Get         | Scaling Offset        | WORD         | (3)                                                                                                                                                                                       |
| 17           | Get         | Multiplier Link       | WORD         | (3)                                                                                                                                                                                       |
| 18           | Get         | Divisor Link          | WORD         | (3)                                                                                                                                                                                       |
| 19           | Get         | Base Link             | WORD         | (3)                                                                                                                                                                                       |
| 20           | Get         | Offset Link           | WORD         | (3)                                                                                                                                                                                       |
| 21           | Get         | Decimal Precision     | BYTE         | (3)                                                                                                                                                                                       |

(1) Access rule is defined in Bit 4 of instance attribute 4 (0 = Get/Set, 1 = Get).

(2) Specified in descriptor, data type, and data size.

(3) Value varies based on parameter instance.

(4) Refer to the EtherNet/IP specification for a description of the link path.

## Parameter Group Object

### Class Code

| Hexadecimal | Decimal |
|-------------|---------|
| 0x10        | 16      |

**Important:** This object is not supported when the adapter is used with a PowerFlex 750-Series drive.

### Services

| Service Code | Implemented for: |          | Service Name         |
|--------------|------------------|----------|----------------------|
|              | Class            | Instance |                      |
| 0x0E         | Yes              | Yes      | Get_Attribute_Single |
| 0x10         | Yes              | No       | Set_Attribute_Single |

### Instances

The number of instances depends on the number of groups in the device. A group of adapter parameters is appended to the list of groups in the device. The total number of groups can be read in Instance 0, Attribute 2.

| Number | Description                 |
|--------|-----------------------------|
| 0      | Class Attributes            |
| 1      | Drive Group 1 Attributes    |
| ⋮      | ⋮                           |
| n      | Last Drive Group Attributes |
| n + 1  | Adapter Group Attributes    |

### Class Attributes

| Attribute ID | Access Rule | Name                    | Data Type | Description                                                                                                                                                 |
|--------------|-------------|-------------------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1            | Get         | Parameter group version | WORD      | 1                                                                                                                                                           |
| 2            | Get         | Max Instance            | WORD      | Total number of groups                                                                                                                                      |
| 8            | Set         | Native Language         | BYTE      | 0 = English<br>1 = French<br>2 = Spanish<br>3 = Italian<br>4 = German<br>5 = Japanese<br>6 = Portuguese<br>7 = Mandarin Chinese<br>8 = Russian<br>9 = Dutch |

### Instance Attributes

| Attribute ID | Access Rule | Name                          | Data Type    | Description                   |
|--------------|-------------|-------------------------------|--------------|-------------------------------|
| 1            | Get         | Group Name String             | SHORT_STRING | Group name                    |
| 2            | Get         | Number of Members in Group    | WORD         | Number of parameters in group |
| 3            | Get         | 1st Parameter Number in Group | WORD         | (1)                           |
| 4            | Get         | 2nd Parameter Number in Group | WORD         | (1)                           |
| n            | Get         | ⋮                             | WORD         | (1)                           |

(1) Value varies based on group instance.

## PCCC Object

### Class Code

| Hexadecimal | Decimal |
|-------------|---------|
| 0x67        | 103     |

### Services

| Service Code | Implemented for: |          | Service Name |
|--------------|------------------|----------|--------------|
|              | Class            | Instance |              |
| 0x4B         | No               | Yes      | Execute_PCCC |
| 0x4C         | No               | Yes      | Execute_DH+  |

### Instances

Supports Instance 1.

### Class Attributes

Not supported.

### Instance Attributes

Not supported.

### Message Structure for Execute\_PCCC

| Request       |                  |                                                 |
|---------------|------------------|-------------------------------------------------|
| Name          | Data Type        | Description                                     |
| Length        | USINT            | Length of requestor ID                          |
| Vendor        | UINT             | Vendor number of requestor                      |
| Serial Number | UDINT            | ASA serial number of requestor                  |
| Other         | Product Specific | Identifier of user, task, etc. on the requestor |
| CMD           | USINT            | Command byte                                    |
| STS           | USINT            | 0                                               |
| TNSW          | UINT             | Transport word                                  |
| FNC           | USINT            | Function code; not used for all CMDs.           |
| PCCC_params   | ARRAY of USINT   | CMD/FNC specific parameters                     |

| Response      |                  |                                                 |
|---------------|------------------|-------------------------------------------------|
| Name          | Data Type        | Description                                     |
| Length        | USINT            | Length of requestor ID                          |
| Vendor        | UINT             | Vendor number of requestor                      |
| Serial Number | UDINT            | ASA serial number of requestor                  |
| Other         | Product Specific | Identifier of user, task, etc. on the requestor |
| CMD           | USINT            | Command byte                                    |
| STS           | USINT            | Status byte                                     |
| TNSW          | UINT             | Transport word. Same value as the request.      |
| EXT_STS       | USINT            | Extended status; not used for all CMDs.         |
| PCCC_results  | ARRAY of USINT   | CMD/FNC specific result data                    |

### Message Structure for Execute\_DH+

| Request         |                   |                                      | Response         |                   |                                            |
|-----------------|-------------------|--------------------------------------|------------------|-------------------|--------------------------------------------|
| Name            | Data Type         | Description                          | Name             | Data Type         | Description                                |
| DLink           | UINT              | Destination Link ID                  | DLink            | UINT              | Destination Link ID                        |
| DSta            | USINT             | Destination Station number           | DSta             | USINT             | Destination Station number                 |
| DUser           | USINT             | Destination "User" number            | DUser            | USINT             | Destination "User" number                  |
| SLink           | UINT              | Source Link ID                       | SLink            | UINT              | Source Link ID                             |
| SSta            | USINT             | Source Station number                | SSta             | USINT             | Source Station number                      |
| SUser           | USINT             | Source User number                   | SUser            | USINT             | Source User number                         |
| CMD             | USINT             | Command byte                         | CMD              | USINT             | Command byte                               |
| STS             | USINT             | 0                                    | STS              | USINT             | Status byte                                |
| TNSW            | UINT              | Transport word                       | TNSW             | UINT              | Transport word. Same value as the request. |
| FNC             | USINT             | Function code; not used for all CMDs | EXT_STS          | USINT             | Extended status; not used for all CMDs     |
| PCCC_<br>params | ARRAY of<br>USINT | CMD/FNC specific parameters          | PCCC_<br>results | ARRAY of<br>USINT | CMD/FNC specific result data               |

The adapter supports the following PCCC command types:

| CMD  | FNC  | Description                                         |
|------|------|-----------------------------------------------------|
| 0x06 | 0x03 | Identify host and some status                       |
| 0x0F | 0x67 | PLC-5 typed write                                   |
| 0x0F | 0x68 | PLC-5 typed read                                    |
| 0x0F | 0x95 | Encapsulate other protocol                          |
| 0x0F | 0xA2 | SLC 500 protected typed read with 3 address fields  |
| 0x0F | 0xAA | SLC 500 protected typed write with 3 address fields |
| 0x0F | 0xA1 | SLC 500 protected typed read with 2 address fields  |
| 0x0F | 0xA9 | SLC 500 protected typed write with 2 address fields |
| 0x0F | 0x00 | Word range read                                     |
| 0x0F | 0x01 | Word range write                                    |

For more information regarding PCCC commands, see *DF1 Protocol and Command Set Manual* (Allen-Bradley publication 1770-6.5.16).

## N-Files

| N-File | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                      |                                          |                   |       |  |      |  |       |                    |                   |    |       |                                    |                                   |  |       |                                   |                                  |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |
|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------------------------------------------|-------------------|-------|--|------|--|-------|--------------------|-------------------|----|-------|------------------------------------|-----------------------------------|--|-------|-----------------------------------|----------------------------------|--|-------|--------------------------------------|--------------------------------------|--|-------|-------------------------------------|-------------------------------------|--|-------|--------------------------------------|--------------------------------------|--|-------|-------------------------------------|-------------------------------------|--|-------|--------------------------------------|--------------------------------------|--|-------|-------------------------------------|-------------------------------------|--|-------|--------------------------------------|--------------------------------------|--|--------|-------------------------------------|-------------------------------------|--|--------|--------------------------------------|--------------------------------------|--|--------|-------------------------------------|-------------------------------------|--|--------|--------------------------------------|--------------------------------------|--|--------|-------------------------------------|-------------------------------------|--|--------|--------------------------------------|--------------------------------------|--|--------|-------------------------------------|-------------------------------------|--|--------|--------------------------------------|--------------------------------------|--|--------|-------------------------------------|-------------------------------------|--|
| N40    | <p>This N-file lets you use Emulated Block Transfer messages to read and write many types of DPI messages. To use Emulated Block Transfer messages, you send a Write message to N40:0...N40:63, wait until the adapter responds with a reply message, and then read the response data in N40:0...N40:63 with a Read message.</p> <p>For details about Block Transfer messages and the data required for each byte in the N-File, refer to the <i>Remote I/O Adapter User Manual</i> (publication 20COMM-UM004).</p> <p>Bits 15...8 are the Most Significant Byte. Bits 7...0 are the Least Significant Byte.</p> <table><tr><th colspan="2">Write</th><th colspan="2">Read</th></tr><tr><td>Bits</td><td>15</td><td>0</td><td>15</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                      |                                          |                   | Write |  | Read |  | Bits  | 15                 | 0                 | 15 |       |                                    |                                   |  |       |                                   |                                  |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |
| Write  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Read                                 |                                          |                   |       |  |      |  |       |                    |                   |    |       |                                    |                                   |  |       |                                   |                                  |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |
| Bits   | 15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 0                                    | 15                                       |                   |       |  |      |  |       |                    |                   |    |       |                                    |                                   |  |       |                                   |                                  |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |
| N40:0  | 0x00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Length (in Bytes)                    | 0x00                                     | Length (in Bytes) |       |  |      |  |       |                    |                   |    |       |                                    |                                   |  |       |                                   |                                  |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |
| N40:1  | DPI Port                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 0x81                                 | Status Size                              | Status Type       |       |  |      |  |       |                    |                   |    |       |                                    |                                   |  |       |                                   |                                  |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |
| N40:2  | 0x00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | CIP Service                          | Data<br>(length varies based on message) |                   |       |  |      |  |       |                    |                   |    |       |                                    |                                   |  |       |                                   |                                  |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |
| N40:3  | CIP Class                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                      |                                          |                   |       |  |      |  |       |                    |                   |    |       |                                    |                                   |  |       |                                   |                                  |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |
| N40:4  | CIP Instance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                      |                                          |                   |       |  |      |  |       |                    |                   |    |       |                                    |                                   |  |       |                                   |                                  |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |
| N40:5  | CIP Attribute                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                      |                                          |                   |       |  |      |  |       |                    |                   |    |       |                                    |                                   |  |       |                                   |                                  |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |
| N40:6  | Data<br>(length varies based on message)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                      |                                          |                   |       |  |      |  |       |                    |                   |    |       |                                    |                                   |  |       |                                   |                                  |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |
| N40:63 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                      |                                          |                   |       |  |      |  |       |                    |                   |    |       |                                    |                                   |  |       |                                   |                                  |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |
| N41    | <p>This N-file lets you read and write control I/O messages. You can write control I/O messages only when all of the following conditions are true:</p> <ul style="list-style-type: none"><li>• The adapter is not receiving I/O from a scanner. For example, there is no scanner on the network, the scanner is in idle (program) mode, the scanner is faulted, or the adapter is not mapped to the scanner.</li><li>• The adapter is not receiving Peer I/O from another adapter.</li><li>• The value of N42:3 is set to a non-zero value.</li></ul> <table><tr><th colspan="2">Write</th><th colspan="2">Read</th></tr><tr><td>N41:0</td><td>Logic Command Word</td><td colspan="2">Logic Status Word</td></tr><tr><td>N41:1</td><td>Reference (least significant word)</td><td colspan="2">Feedback (least significant word)</td></tr><tr><td>N41:2</td><td>Reference (most significant word)</td><td colspan="2">Feedback (most significant word)</td></tr><tr><td>N41:3</td><td>Datalink A1 (least significant word)</td><td colspan="2">Datalink A1 (least significant word)</td></tr><tr><td>N41:4</td><td>Datalink A1 (most significant word)</td><td colspan="2">Datalink A1 (most significant word)</td></tr><tr><td>N41:5</td><td>Datalink A2 (least significant word)</td><td colspan="2">Datalink A2 (least significant word)</td></tr><tr><td>N41:6</td><td>Datalink A2 (most significant word)</td><td colspan="2">Datalink A2 (most significant word)</td></tr><tr><td>N41:7</td><td>Datalink B1 (least significant word)</td><td colspan="2">Datalink B1 (least significant word)</td></tr><tr><td>N41:8</td><td>Datalink B1 (most significant word)</td><td colspan="2">Datalink B1 (most significant word)</td></tr><tr><td>N41:9</td><td>Datalink B2 (least significant word)</td><td colspan="2">Datalink B2 (least significant word)</td></tr><tr><td>N41:10</td><td>Datalink B2 (most significant word)</td><td colspan="2">Datalink B2 (most significant word)</td></tr><tr><td>N41:11</td><td>Datalink C1 (least significant word)</td><td colspan="2">Datalink C1 (least significant word)</td></tr><tr><td>N41:12</td><td>Datalink C1 (most significant word)</td><td colspan="2">Datalink C1 (most significant word)</td></tr><tr><td>N41:13</td><td>Datalink C2 (least significant word)</td><td colspan="2">Datalink C2 (least significant word)</td></tr><tr><td>N41:14</td><td>Datalink C2 (most significant word)</td><td colspan="2">Datalink C2 (most significant word)</td></tr><tr><td>N41:15</td><td>Datalink D1 (least significant word)</td><td colspan="2">Datalink D1 (least significant word)</td></tr><tr><td>N41:16</td><td>Datalink D1 (most significant word)</td><td colspan="2">Datalink D1 (most significant word)</td></tr><tr><td>N41:17</td><td>Datalink D2 (least significant word)</td><td colspan="2">Datalink D2 (least significant word)</td></tr><tr><td>N41:18</td><td>Datalink D2 (most significant word)</td><td colspan="2">Datalink D2 (most significant word)</td></tr></table> |                                      |                                          |                   | Write |  | Read |  | N41:0 | Logic Command Word | Logic Status Word |    | N41:1 | Reference (least significant word) | Feedback (least significant word) |  | N41:2 | Reference (most significant word) | Feedback (most significant word) |  | N41:3 | Datalink A1 (least significant word) | Datalink A1 (least significant word) |  | N41:4 | Datalink A1 (most significant word) | Datalink A1 (most significant word) |  | N41:5 | Datalink A2 (least significant word) | Datalink A2 (least significant word) |  | N41:6 | Datalink A2 (most significant word) | Datalink A2 (most significant word) |  | N41:7 | Datalink B1 (least significant word) | Datalink B1 (least significant word) |  | N41:8 | Datalink B1 (most significant word) | Datalink B1 (most significant word) |  | N41:9 | Datalink B2 (least significant word) | Datalink B2 (least significant word) |  | N41:10 | Datalink B2 (most significant word) | Datalink B2 (most significant word) |  | N41:11 | Datalink C1 (least significant word) | Datalink C1 (least significant word) |  | N41:12 | Datalink C1 (most significant word) | Datalink C1 (most significant word) |  | N41:13 | Datalink C2 (least significant word) | Datalink C2 (least significant word) |  | N41:14 | Datalink C2 (most significant word) | Datalink C2 (most significant word) |  | N41:15 | Datalink D1 (least significant word) | Datalink D1 (least significant word) |  | N41:16 | Datalink D1 (most significant word) | Datalink D1 (most significant word) |  | N41:17 | Datalink D2 (least significant word) | Datalink D2 (least significant word) |  | N41:18 | Datalink D2 (most significant word) | Datalink D2 (most significant word) |  |
| Write  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Read                                 |                                          |                   |       |  |      |  |       |                    |                   |    |       |                                    |                                   |  |       |                                   |                                  |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |
| N41:0  | Logic Command Word                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Logic Status Word                    |                                          |                   |       |  |      |  |       |                    |                   |    |       |                                    |                                   |  |       |                                   |                                  |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |
| N41:1  | Reference (least significant word)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Feedback (least significant word)    |                                          |                   |       |  |      |  |       |                    |                   |    |       |                                    |                                   |  |       |                                   |                                  |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |
| N41:2  | Reference (most significant word)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Feedback (most significant word)     |                                          |                   |       |  |      |  |       |                    |                   |    |       |                                    |                                   |  |       |                                   |                                  |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |
| N41:3  | Datalink A1 (least significant word)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Datalink A1 (least significant word) |                                          |                   |       |  |      |  |       |                    |                   |    |       |                                    |                                   |  |       |                                   |                                  |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |
| N41:4  | Datalink A1 (most significant word)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Datalink A1 (most significant word)  |                                          |                   |       |  |      |  |       |                    |                   |    |       |                                    |                                   |  |       |                                   |                                  |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |
| N41:5  | Datalink A2 (least significant word)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Datalink A2 (least significant word) |                                          |                   |       |  |      |  |       |                    |                   |    |       |                                    |                                   |  |       |                                   |                                  |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |
| N41:6  | Datalink A2 (most significant word)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Datalink A2 (most significant word)  |                                          |                   |       |  |      |  |       |                    |                   |    |       |                                    |                                   |  |       |                                   |                                  |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |
| N41:7  | Datalink B1 (least significant word)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Datalink B1 (least significant word) |                                          |                   |       |  |      |  |       |                    |                   |    |       |                                    |                                   |  |       |                                   |                                  |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |
| N41:8  | Datalink B1 (most significant word)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Datalink B1 (most significant word)  |                                          |                   |       |  |      |  |       |                    |                   |    |       |                                    |                                   |  |       |                                   |                                  |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |
| N41:9  | Datalink B2 (least significant word)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Datalink B2 (least significant word) |                                          |                   |       |  |      |  |       |                    |                   |    |       |                                    |                                   |  |       |                                   |                                  |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |
| N41:10 | Datalink B2 (most significant word)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Datalink B2 (most significant word)  |                                          |                   |       |  |      |  |       |                    |                   |    |       |                                    |                                   |  |       |                                   |                                  |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |
| N41:11 | Datalink C1 (least significant word)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Datalink C1 (least significant word) |                                          |                   |       |  |      |  |       |                    |                   |    |       |                                    |                                   |  |       |                                   |                                  |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |
| N41:12 | Datalink C1 (most significant word)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Datalink C1 (most significant word)  |                                          |                   |       |  |      |  |       |                    |                   |    |       |                                    |                                   |  |       |                                   |                                  |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |
| N41:13 | Datalink C2 (least significant word)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Datalink C2 (least significant word) |                                          |                   |       |  |      |  |       |                    |                   |    |       |                                    |                                   |  |       |                                   |                                  |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |
| N41:14 | Datalink C2 (most significant word)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Datalink C2 (most significant word)  |                                          |                   |       |  |      |  |       |                    |                   |    |       |                                    |                                   |  |       |                                   |                                  |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |
| N41:15 | Datalink D1 (least significant word)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Datalink D1 (least significant word) |                                          |                   |       |  |      |  |       |                    |                   |    |       |                                    |                                   |  |       |                                   |                                  |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |
| N41:16 | Datalink D1 (most significant word)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Datalink D1 (most significant word)  |                                          |                   |       |  |      |  |       |                    |                   |    |       |                                    |                                   |  |       |                                   |                                  |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |
| N41:17 | Datalink D2 (least significant word)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Datalink D2 (least significant word) |                                          |                   |       |  |      |  |       |                    |                   |    |       |                                    |                                   |  |       |                                   |                                  |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |
| N41:18 | Datalink D2 (most significant word)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Datalink D2 (most significant word)  |                                          |                   |       |  |      |  |       |                    |                   |    |       |                                    |                                   |  |       |                                   |                                  |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |
| N42    | This N-file lets you read and write some values configuring the port.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                      |                                          |                   |       |  |      |  |       |                    |                   |    |       |                                    |                                   |  |       |                                   |                                  |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |
| N42:3  | Time-out (read/write): Time (in seconds) allowed between messages to the N41 file. If the adapter does not receive a message in the specified time, it performs the fault action configured in its [Comm Flt Action] parameter. A valid setting is between 1 and 32767 seconds (5...20 seconds is recommended).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                      |                                          |                   |       |  |      |  |       |                    |                   |    |       |                                    |                                   |  |       |                                   |                                  |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |
| N42:7  | Adapter Port Number (read only): DPI port on the drive to which the adapter is connected.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                      |                                          |                   |       |  |      |  |       |                    |                   |    |       |                                    |                                   |  |       |                                   |                                  |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |
| N42:8  | Peer Adapters (read only): Bit field of devices having DPI Peer capabilities.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                      |                                          |                   |       |  |      |  |       |                    |                   |    |       |                                    |                                   |  |       |                                   |                                  |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |       |                                     |                                     |  |       |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |        |                                      |                                      |  |        |                                     |                                     |  |

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|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| N45    | <p>This N-file lets you read and write control I/O messages. You can write control I/O messages only when all of the following conditions are true:</p> <ul style="list-style-type: none"> <li>• The adapter is not receiving I/O from a scanner. For example, there is no scanner on the network, the scanner is in idle (program) mode, the scanner is faulted, or the adapter is not mapped to the scanner.</li> <li>• The adapter is not receiving Peer I/O from another adapter.</li> <li>• The value of N42:3 is set to a non-zero value.</li> </ul> |                                  |
|        | <i>Write</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <i>Read</i>                      |
| N45:0  | Logic Command (least significant)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Logic Status (least significant) |
| N45:1  | Logic Command (most significant)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Logic Status (most significant)  |
| N45:2  | Reference (least significant)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Feedback (least significant)     |
| N45:3  | Reference (most significant)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Feedback (most significant)      |
| N45:4  | DL From Net 01 (least significant)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | DL To Net 01 (least significant) |
| N45:5  | DL From Net 01 (most significant)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | DL To Net 01 (most significant)  |
| N45:6  | DL From Net 02 (least significant)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | DL To Net 02 (least significant) |
| N45:7  | DL From Net 02 (most significant)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | DL To Net 02 (most significant)  |
| N45:8  | DL From Net 03 (least significant)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | DL To Net 03 (least significant) |
| N45:9  | DL From Net 03 (most significant)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | DL To Net 03 (most significant)  |
| N45:10 | DL From Net 04 (least significant)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | DL To Net 04 (least significant) |
| N45:11 | DL From Net 04 (most significant)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | DL To Net 04 (most significant)  |
| N45:12 | DL From Net 05 (least significant)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | DL To Net 05 (least significant) |
| N45:13 | DL From Net 05 (most significant)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | DL To Net 05 (most significant)  |
| N45:14 | DL From Net 06 (least significant)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | DL To Net 06 (least significant) |
| N45:15 | DL From Net 06 (most significant)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | DL To Net 06 (most significant)  |
| N45:16 | DL From Net 07 (least significant)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | DL To Net 07 (least significant) |
| N45:17 | DL From Net 07 (most significant)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | DL To Net 07 (most significant)  |
| N45:18 | DL From Net 08 (least significant)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | DL To Net 08 (least significant) |
| N45:19 | DL From Net 08 (most significant)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | DL To Net 08 (most significant)  |
| N45:20 | DL From Net 09 (least significant)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | DL To Net 09 (least significant) |
| N45:21 | DL From Net 09 (most significant)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | DL To Net 09 (most significant)  |
| N45:22 | DL From Net 10 (least significant)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | DL To Net 10 (least significant) |
| N45:23 | DL From Net 10 (most significant)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | DL To Net 10 (most significant)  |
| N45:24 | DL From Net 11 (least significant)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | DL To Net 11 (least significant) |
| N45:25 | DL From Net 11 (most significant)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | DL To Net 11 (most significant)  |
| N45:26 | DL From Net 12 (least significant)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | DL To Net 12 (least significant) |
| N45:27 | DL From Net 12 (most significant)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | DL To Net 12 (most significant)  |
| N45:28 | DL From Net 13 (least significant)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | DL To Net 13 (least significant) |
| N45:29 | DL From Net 13 (most significant)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | DL To Net 13 (most significant)  |
| N45:30 | DL From Net 14 (least significant)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | DL To Net 14 (least significant) |
| N45:31 | DL From Net 14 (most significant)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | DL To Net 14 (most significant)  |
| N45:32 | DL From Net 15 (least significant)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | DL To Net 15 (least significant) |
| N45:33 | DL From Net 15 (most significant)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | DL To Net 15 (most significant)  |
| N45:34 | DL From Net 16 (least significant)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | DL To Net 16 (least significant) |
| N45:35 | DL From Net 16 (most significant)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | DL To Net 16 (most significant)  |

**Important:** If your controller or HMI platform supports CIP messaging, use the CIP Parameter object to get and set parameters.

| N-File       | Description                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N150...N199  | These N-files let you read and write parameter values in DPI Port 0 (the host PowerFlex drive) as 32-bit double words. You can interpret the data in various ways (for example, 32-bit real, 32-bit integer). To read a parameter, you need to send a message with two elements. For example, to read parameter 1, read two elements beginning at N150:2. As another example, to read parameters 2...6, read ten elements beginning at N150:4. |
| N150:0...1   | Number of parameters in the drive                                                                                                                                                                                                                                                                                                                                                                                                              |
| N150:2...249 | Drive parameters 1...124                                                                                                                                                                                                                                                                                                                                                                                                                       |
| N151:0...249 | Drive parameters 125...249                                                                                                                                                                                                                                                                                                                                                                                                                     |
| N152:0...249 | Drive parameters 250...374                                                                                                                                                                                                                                                                                                                                                                                                                     |
| N153:0...249 | Drive parameters 375...499                                                                                                                                                                                                                                                                                                                                                                                                                     |
| :            | :                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| N199:0...249 | Drive parameters 6125...6249                                                                                                                                                                                                                                                                                                                                                                                                                   |

| N-File                                                                                               | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N201...N212                                                                                          | These N-files let you read and write values to DPI and Host parameters in Ports 1...14 (for example, a HIM or adapter) as 32-bit double words. You can interpret the data in various ways (for example, 32-bit real, 32-bit integer) To read a parameter, you need to send a message with two elements. For example, to read parameter 1 in the peripheral connected to DPI port 1, read two elements beginning at N201:2. As another example, to read parameters 2...6 in the peripheral connected to DPI port 5 (the adapter), read ten elements beginning at N209:4. |
| N201:0...1                                                                                           | Number of parameters in the DPI peripheral at DPI port 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| N201:2...249                                                                                         | Parameters 1...124 in the DPI peripheral at DPI port 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| N202:0...249                                                                                         | Parameters 125...249 in the DPI peripheral at DPI port 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| N203:0...1                                                                                           | Number of parameters in the DPI peripheral at DPI port 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| N203:2...249                                                                                         | Parameters 1...124 in the DPI peripheral at DPI port 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| N204:0...249                                                                                         | Parameters 125...249 in the DPI peripheral at DPI port 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| N205:0...1                                                                                           | Number of parameters in the DPI peripheral at DPI port 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| N205:2...249                                                                                         | Parameters 1...124 in the DPI peripheral at DPI port 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| N206:0...249                                                                                         | Parameters 125...249 in the DPI peripheral at DPI port 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| N207:0...1                                                                                           | Number of parameters in the DPI peripheral at DPI port 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| N207:2...249                                                                                         | Parameters 1...124 in the DPI peripheral at DPI port 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| N208:0...249                                                                                         | Parameters 125...249 in the DPI peripheral at DPI port 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| N209:0...1                                                                                           | Number of parameters in the DPI peripheral at DPI port 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| N209:2...249                                                                                         | Parameters 1...124 in the DPI peripheral at DPI port 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| N210:0...249                                                                                         | Parameters 125...249 in the DPI peripheral at DPI port 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| N211:0...1                                                                                           | Number of parameters in the DPI peripheral at DPI port 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| N211:2...249                                                                                         | Parameters 1...124 in the DPI peripheral at DPI port 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| N212:0...249                                                                                         | Parameters 125...249 in the DPI peripheral at DPI port 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| The following N-Files are supported only when the adapter is used with a PowerFlex 750-Series drive. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| N213:0...1                                                                                           | Number of parameters in the DPI peripheral at DPI port 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| N213:2...249                                                                                         | Parameters 1...124 in the DPI peripheral at DPI port 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| N214:0...249                                                                                         | Parameters 125...249 in the DPI peripheral at DPI port 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| N215:0...1                                                                                           | Number of parameters in the DPI peripheral at DPI port 8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| N215:2...249                                                                                         | Parameters 1...124 in the DPI peripheral at DPI port 8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| N216:0...249                                                                                         | Parameters 125...249 in the DPI peripheral at DPI port 8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| N217:0...1                                                                                           | Number of parameters in the DPI peripheral at DPI port 9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| N217:2...249                                                                                         | Parameters 1...124 in the DPI peripheral at DPI port 9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| N218:0...249                                                                                         | Parameters 125...249 in the DPI peripheral at DPI port 9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| N219:0...1                                                                                           | Number of parameters in the DPI peripheral at DPI port 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| N219:2...249                                                                                         | Parameters 1...124 in the DPI peripheral at DPI port 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| N220:0...249                                                                                         | Parameters 125...249 in the DPI peripheral at DPI port 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| N221:0...1                                                                                           | Number of parameters in the DPI peripheral at DPI port 11                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| N221:2...249                                                                                         | Parameters 1...124 in the DPI peripheral at DPI port 11                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| N222:0...249                                                                                         | Parameters 125...249 in the DPI peripheral at DPI port 11                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| N223:0...1                                                                                           | Number of parameters in the DPI peripheral at DPI port 12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| N223:2...249                                                                                         | Parameters 1...124 in the DPI peripheral at DPI port 12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| N224:0...249                                                                                         | Parameters 125...249 in the DPI peripheral at DPI port 12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| N225:0...1                                                                                           | Number of parameters in the DPI peripheral at DPI port 13                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| N225:2...249                                                                                         | Parameters 1...124 in the DPI peripheral at DPI port 13                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| N226:0...249                                                                                         | Parameters 125...249 in the DPI peripheral at DPI port 13                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| N227:0...1                                                                                           | Number of parameters in the DPI peripheral at DPI port 14                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| N227:2...249                                                                                         | Parameters 1...124 in the DPI peripheral at DPI port 14                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| N228:0...249                                                                                         | Parameters 125...249 in the DPI peripheral at DPI port 14                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

## DPI Device Object

### Class Code

| Hexadecimal | Decimal |
|-------------|---------|
| 0x92        | 146     |

### Services

| Service Code | Implemented for: |          | Service Name         |
|--------------|------------------|----------|----------------------|
|              | Class            | Instance |                      |
| 0x0E         | Yes              | Yes      | Get_Attribute_Single |
| 0x10         | Yes              | Yes      | Set_Attribute_Single |

### Instances

The number of instances depends on the number of components in the device. The total number of components can be read in Instance 0, Class Attribute 4.

| Instances (Hex.)               | (Dec.)        | Device      | Example | Description                |
|--------------------------------|---------------|-------------|---------|----------------------------|
| 0x0000...0x3FFF                | 0...16383     | Host        | 0       | Class Attributes (Drive)   |
| 0x4000...0x43FF                | 16384...17407 | Adapter     | 1       | Drive Component 1          |
| 0x4400...0x47FF                | 17408...18431 | DPI Port 1  | 2       | Drive Component 2          |
| 0x4800...0x4BFF                | 18432...19455 | DPI Port 2  | :       | :                          |
| 0x4C00...0x4FFF                | 19456...20479 | DPI Port 3  | 16384   | Class Attributes (Adapter) |
| 0x5000...0x53FF                | 20480...21503 | DPI Port 4  | 16385   | Adapter Component 1        |
| 0x5400...0x57FF                | 21504...22527 | DPI Port 5  | :       | :                          |
| 0x5800...0x5BFF                | 22528...23551 | DPI Port 6  |         |                            |
| 0x5C00...0x5FFF <sup>(1)</sup> | 22552...24575 | DPI Port 7  |         |                            |
| 0x6000...0x63FF <sup>(1)</sup> | 24576...25599 | DPI Port 8  |         |                            |
| 0x6400...0x67FF <sup>(1)</sup> | 25600...26623 | DPI Port 9  |         |                            |
| 0x6800...0x6BFF <sup>(1)</sup> | 26624...27647 | DPI Port 10 |         |                            |
| 0x6C00...0x6FFF <sup>(1)</sup> | 27648...28671 | DPI Port 11 |         |                            |
| 0x7000...0x73FF <sup>(1)</sup> | 28672...29695 | DPI Port 12 |         |                            |
| 0x7400...0x77FF <sup>(1)</sup> | 29696...30719 | DPI Port 13 |         |                            |
| 0x7800...0x7BFF <sup>(1)</sup> | 30720...31743 | DPI Port 14 |         |                            |

<sup>(1)</sup> These instances are supported only when the adapter is used with a PowerFlex 750-Series drive.

### Class Attributes

| Attribute ID | Access Rule | Name        | Data Type  | Description                                                                                                                                                                                                                                                                                                            |
|--------------|-------------|-------------|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0            | Get         | Family Code | BYTE       | 0x00 = DPI Peripheral<br>0x30 = PowerFlex 70<br>0x34 = PowerFlex 700H<br>0x38, 0x39, or 0x3A = PowerFlex 700<br>0x40 = PowerFlex 7000<br>0x48, 0x49, or 0x4A = PowerFlex 700S<br>0x5A = SMC Flex<br>0x68, 0x69, or 0x6A = PowerFlex 700VC<br>0x90 = PowerFlex 753/755<br>0xA0 = 20-750-xxx Option Module<br>0xFF = HIM |
| 1            | Get         | Family Text | STRING[16] | Text identifying the device.                                                                                                                                                                                                                                                                                           |

| Attribute ID | Access Rule | Name                              | Data Type                          | Description                                                                                                                                                                                                                                                                                                                         |
|--------------|-------------|-----------------------------------|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2            | Set         | Language Code                     | BYTE                               | 0 = English<br>1 = French<br>2 = Spanish<br>3 = Italian<br>4 = German<br>5 = Japanese<br>6 = Portuguese<br>7 = Mandarin Chinese<br>8 = Russian<br>9 = Dutch                                                                                                                                                                         |
| 3            | Get         | Product Series                    | BYTE                               | 1 = A<br>2 = B ...                                                                                                                                                                                                                                                                                                                  |
| 4            | Get         | Number of Components              | BYTE                               | Number of components (e.g., main control board, I/O boards) in the device.                                                                                                                                                                                                                                                          |
| 5            | Set         | User Definable Text               | STRING[16]                         | Text identifying the device with a user-supplied name.                                                                                                                                                                                                                                                                              |
| 6            | Get         | Status Text                       | STRING[12]                         | Text describing the status of the device.                                                                                                                                                                                                                                                                                           |
| 7            | Get         | Configuration Code                | BYTE                               | Identification of variations.                                                                                                                                                                                                                                                                                                       |
| 8            | Get         | Configuration Text                | STRING[16]                         | Text identifying a variation of a family device.                                                                                                                                                                                                                                                                                    |
| 9            | Get         | Brand Code                        | WORD                               | 0x0001 = Allen-Bradley                                                                                                                                                                                                                                                                                                              |
| 11           | Get         | NVS Checksum                      | WORD                               | Checksum of the Non-Volatile Storage in a device.                                                                                                                                                                                                                                                                                   |
| 12           | Get         | Class Revision                    | WORD                               | 2 = DPI                                                                                                                                                                                                                                                                                                                             |
| 13           | Get         | Character Set Code                | BYTE                               | 0 = SCANport HIM<br>1 = ISO 8859-1 (Latin 1)<br>2 = ISO 8859-2 (Latin 2)<br>3 = ISO 8859-3 (Latin 3)<br>4 = ISO 8859-4 (Latin 4)<br>5 = ISO 8859-5 (Cyrillic)<br>6 = ISO 8859-6 (Arabic)<br>7 = ISO 8859-7 (Greek)<br>8 = ISO 8859-8 (Hebrew)<br>9 = ISO 8859-9 (Turkish)<br>10 = ISO 8859-10 (Nordic)<br>255 = ISO 10646 (Unicode) |
| 14           | Get         | Product Option Support            | BOOL[64]                           |                                                                                                                                                                                                                                                                                                                                     |
| 15           | Get         | Languages Supported               | STRUCT of:<br>BYTE<br>BYTE[n]      | Number of Languages<br>Language Codes (see Class Attribute 2)                                                                                                                                                                                                                                                                       |
| 16           | Get         | Date of Manufacture               | STRUCT of:<br>WORD<br>BYTE<br>BYTE | Year<br>Month<br>Day                                                                                                                                                                                                                                                                                                                |
| 17           | Get         | Product Revision                  | STRUCT of:<br>BYTE<br>BYTE         | Major Firmware Release<br>Minor Firmware Release                                                                                                                                                                                                                                                                                    |
| 18           | Get         | Serial Number                     | DWORD                              | Value between 0x00000000 and 0xFFFFFFFF                                                                                                                                                                                                                                                                                             |
| 19           | Set         | Language Selected                 | BYTE                               | 0 = Default (HIM will prompt at start up)<br>1 = Language was selected (no prompt)                                                                                                                                                                                                                                                  |
| 20           | Set         | Customer-Generated Firmware       | STRING[36]                         | GUID (Globally Unique Identifier) identifying customer firmware flashed into the device.                                                                                                                                                                                                                                            |
| 30           | Get         | International Status Text         | STRINGN                            | Text describing the status of device with support for Unicode.                                                                                                                                                                                                                                                                      |
| 31           | Get/Set     | International User Definable Text | STRINGN                            | Text identifying the device with a user-supplied name with support for Unicode.                                                                                                                                                                                                                                                     |

| Attribute ID | Access Rule | Name                          | Data Type                                                                                                | Description                                                                                                                                                                                                              |
|--------------|-------------|-------------------------------|----------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 34           | Get         | Key Information               | STRUCT of:<br>DWORD<br>DWORD<br>WORD<br>WORD<br>WORD<br>BYTE<br>BYTE<br>BYTE<br>BYTE<br>BYTE<br>BYTE[16] | Rating Code<br>Device Serial Number<br>Customization Code<br>Customization Revision<br>Brand Code<br>Family Code<br>Config Code<br>Language Code<br>Major Revision<br>Minor Revision<br>Customer-Generated Firmware UUID |
| 35           | Get         | NVS CRC                       | DWORD                                                                                                    | A 32-bit CRC of the Non-Volatile Storage in a device.                                                                                                                                                                    |
| 39           | Get         | SI Driver Code                | WORD                                                                                                     | Code identifying the protocol between the device and host.                                                                                                                                                               |
| 128          | Get         | Customization Code            | WORD                                                                                                     | Code identifying the customized device.                                                                                                                                                                                  |
| 129          | Get         | Customization Revision Number | WORD                                                                                                     | Revision of the customized device.                                                                                                                                                                                       |
| 130          | Get         | Customization Device Text     | STRING[32]                                                                                               | Text identifying the customized device.                                                                                                                                                                                  |

### Instance Attributes

| Attribute ID | Access Rule | Name                         | Data Type                  | Description                                     |
|--------------|-------------|------------------------------|----------------------------|-------------------------------------------------|
| 3            | Get         | Component Name               | STRING[32]                 | Name of the component                           |
| 4            | Get         | Component Firmware Revision  | STRUCT of:<br>BYTE<br>BYTE | Major Revision<br>Minor Revision                |
| 8            | Get         | Component Serial Number      | DWORD                      | Value between 0x00000000 and 0xFFFFFFFF         |
| 9            | Get         | International Component Name | STRINGN                    | Name of the component with support for Unicode. |

## DPI Parameter Object

### Class Code

| Hexadecimal | Decimal |
|-------------|---------|
| 0x93        | 147     |

To access “Host Config” parameters, use the HOST DPI Parameter Object (Class code 0x9F).

### Instances

The number of instances depends on the number of parameters in the device. The total number of parameters can be read in Instance 0, Attribute 0.

| Instances (Hex.)               | (Dec.)        | Device      | Example | Description                    |
|--------------------------------|---------------|-------------|---------|--------------------------------|
| 0x0000...0x3FFF                | 0...16383     | Host        | 0       | Class Attributes (Drive)       |
| 0x4000...0x43FF                | 16384...17407 | Adapter     | 1       | Drive Parameter 1 Attributes   |
| 0x4400...0x47FF                | 17408...18431 | DPI Port 1  | 2       | Drive Parameter 2 Attributes   |
| 0x4800...0x4BFF                | 18432...19455 | DPI Port 2  | :       | :                              |
| 0x4C00...0x4FFF                | 19456...20479 | DPI Port 3  | 16384   | Class Attributes (Adapter)     |
| 0x5000...0x53FF                | 20480...21503 | DPI Port 4  | 16385   | Adapter Parameter 1 Attributes |
| 0x5400...0x57FF                | 21504...22527 | DPI Port 5  | :       | :                              |
| 0x5800...0x5BFF                | 22528...23551 | DPI Port 6  |         |                                |
| 0x5C00...0x5FFF <sup>(1)</sup> | 23552...24575 | DPI Port 7  |         |                                |
| 0x6000...0x63FF <sup>(1)</sup> | 24576...25599 | DPI Port 8  |         |                                |
| 0x6400...0x67FF <sup>(1)</sup> | 25600...26623 | DPI Port 9  |         |                                |
| 0x6800...0x6BFF <sup>(1)</sup> | 26624...27647 | DPI Port 10 |         |                                |
| 0x6C00...0x6FFF <sup>(1)</sup> | 27648...28671 | DPI Port 11 |         |                                |
| 0x7000...0x73FF <sup>(1)</sup> | 28672...29695 | DPI Port 12 |         |                                |
| 0x7400...0x77FF <sup>(1)</sup> | 29696...30719 | DPI Port 13 |         |                                |
| 0x7800...0x7BFF <sup>(1)</sup> | 30720...31743 | DPI Port 14 |         |                                |

<sup>(1)</sup> These instances are supported only when the adapter is used with a PowerFlex 750-Series drive.

### Class Attributes

| Attribute ID | Access Rule | Name                             | Data Type | Description                                                                                                                                         |
|--------------|-------------|----------------------------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| 0            | Get         | Number of Instances              | WORD      | Number of parameters in the device                                                                                                                  |
| 1            | Set         | Write Protect Password           | WORD      | 0 = Password disabled<br>n = Password                                                                                                               |
| 2            | Set         | NVS Command Write                | BYTE      | 0 = No Operation<br>1 = Store values in active memory to NVS<br>2 = Load values in NVS to active memory<br>3 = Load default values to active memory |
| 3            | Get         | NVS Parameter Value Checksum     | WORD      | Checksum of all parameter values in a user set in NVS                                                                                               |
| 4            | Get         | NVS Link Value Checksum          | WORD      | Checksum of parameter links in a user set in NVS                                                                                                    |
| 5            | Get         | First Accessible Parameter       | WORD      | First parameter available if parameters are protected by passwords. A “0” indicates all parameters are protected.                                   |
| 7            | Get         | Class Revision                   | WORD      | 2 = DPI                                                                                                                                             |
| 8            | Get         | First Parameter Processing Error | WORD      | The first parameter that has been written with a value outside of its range. A “0” indicates no errors.                                             |
| 9            | Set         | Link Command                     | BYTE      | 0 = No Operation<br>1 = Clear All Parameter Links (This does not clear links to function blocks.)                                                   |

## Instance Attributes

| Attribute ID | Access Rule | Name                       | Data Type                                                                                                                                                                                                                    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|--------------|-------------|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6            | Get         | DPI Offline Read Full      | STRUCT of:<br>BOOL[32]<br>CONTAINER<br>CONTAINER<br>CONTAINER<br>STRING[16]<br>STRING[4]<br>WORD<br>WORD<br>WORD<br>WORD<br>WORD<br>WORD<br>WORD<br>BYTE<br>BYTE<br>WORD<br>WORD<br>CONTAINER<br>WORD<br>WORD<br>WORD<br>INT | Descriptor<br>Offline minimum value<br>Offline maximum value<br>Offline default value<br>Parameter name<br>Offline parameter units<br>Online minimum parameter instance<br>Online maximum parameter instance<br>Online default parameter instance<br>Multiple parameter instance<br>Divisor parameter instance<br>Base parameter instance<br>Offset parameter instance<br>Formula number<br>Pad byte (always zero)<br>Help instance<br>Pad word (always a value of zero)<br>Parameter value<br>Multiplier<br>Divisor<br>Base<br>Offset |
| 7            | Get         | DPI Online Read Full       | STRUCT of:<br>BOOL[32]<br>CONTAINER <sup>(1)</sup><br>CONTAINER<br>CONTAINER<br>CONTAINER<br>WORD<br>WORD<br>STRING[4]<br>WORD<br>WORD<br>WORD<br>WORD<br>INT<br>BYTE[3]<br>BYTE<br>STRING[16]                               | Descriptor (see page <a href="#">C-19</a> )<br>Parameter value<br>Minimum value<br>Maximum value<br>Default value<br>Next parameter<br>Previous parameter<br>Units (for example, Amp, Hz)<br>Multiplier <sup>(2)</sup><br>Divisor <sup>(2)</sup><br>Base <sup>(2)</sup><br>Offset <sup>(2)</sup><br>Link (source of the value) (0 = no link)<br>Always zero (0)<br>Parameter name                                                                                                                                                      |
| 8            | Get         | DPI Descriptor             | BOOL[32]                                                                                                                                                                                                                     | Descriptor (see page <a href="#">C-19</a> )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 9            | Get/Set     | DPI Parameter Value        | Various                                                                                                                                                                                                                      | Parameter value in NVS. <sup>(3)</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 10           | Get/Set     | DPI RAM Parameter Value    | Various                                                                                                                                                                                                                      | Parameter value in temporary memory.<br>Valid only for DPI drives.                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 11           | Get/Set     | DPI Link                   | BYTE[3]                                                                                                                                                                                                                      | Link (parameter or function block that is the source of the value) (0 = no link)                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 12           | Get         | Help Object Instance       | WORD                                                                                                                                                                                                                         | ID for help text for this parameter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 13           | Get         | DPI Read Basic             | STRUCT of:<br>BOOL[32]<br>CONTAINER<br>CONTAINER<br>CONTAINER<br>CONTAINER<br>STRING[16]<br>STRING[4]                                                                                                                        | Descriptor (see page <a href="#">C-19</a> )<br>Parameter value<br>Minimum value<br>Maximum value<br>Default value<br>Parameter name<br>Units (for example, Amp, Hz)                                                                                                                                                                                                                                                                                                                                                                    |
| 14           | Get         | DPI Parameter Name         | STRING[16]                                                                                                                                                                                                                   | Parameter name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 15           | Get         | DPI Parameter Alias        | STRING[16]                                                                                                                                                                                                                   | Customer supplied parameter name.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 16           | Get         | Parameter Processing Error | BYTE                                                                                                                                                                                                                         | 0 = No error<br>1 = Value is less than the minimum<br>2 = Value is greater than the maximum                                                                                                                                                                                                                                                                                                                                                                                                                                            |

- (1) A CONTAINER is a 32-bit block of data that contains the data type used by a parameter value. If signed, the value is sign extended. Padding is used in the CONTAINER to ensure that it is always 32-bits.
- (2) This value is used in the formulas used to convert the parameter value between display units and internal units. Refer to [Formulas for Converting on page C-21](#).
- (3) Do NOT continually write parameter data to NVS. Refer to the attention on [page 6-1](#).

## Descriptor Attributes

| Bit | Name                       | Description                                                                                                                                                                                                                                                            |
|-----|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0   | Data Type (Bit 1)          | Right bit is least significant bit (0).                                                                                                                                                                                                                                |
| 1   | Data Type (Bit 2)          | 000 = BYTE used as an array of Boolean                                                                                                                                                                                                                                 |
| 2   | Data Type (Bit 3)          | 001 = WORD used as an array of Boolean<br>010 = BYTE (8-bit integer)<br>011 = WORD (16-bit integer)<br>100 = DWORD (32-bit integer)<br>101 = TCHAR (8-bit (not unicode) or 16-bits (unicode))<br>110 = REAL (32-bit floating point value)<br>111 = Use bits 16, 17, 18 |
| 3   | Sign Type                  | 0 = Unsigned<br>1 = Signed                                                                                                                                                                                                                                             |
| 4   | Hidden                     | 0 = Visible<br>1 = Hidden                                                                                                                                                                                                                                              |
| 5   | Not a Link Sink            | 0 = Parameter can sink a link<br>1 = Parameter cannot sink a link                                                                                                                                                                                                      |
| 6   | Not Recallable             | 0 = Recallable from NVS<br>1 = Not Recallable from NVS                                                                                                                                                                                                                 |
| 7   | ENUM                       | 0 = No ENUM text<br>1 = ENUM text                                                                                                                                                                                                                                      |
| 8   | Writable                   | 0 = Read only<br>1 = Read/write                                                                                                                                                                                                                                        |
| 9   | Not Writable When Enabled  | 0 = Writable when enabled (for example, drive running)<br>1 = Not writable when enabled                                                                                                                                                                                |
| 10  | Instance                   | 0 = Parameter value is not a Reference to another parameter<br>1 = Parameter value refers to another parameter                                                                                                                                                         |
| 11  | Uses Bit ENUM Mask         | This parameter instance supports the Bit ENUM Mask attribute. For more information, see the definition of the attribute.                                                                                                                                               |
| 12  | Decimal Place (Bit 0)      | Number of digits to the right of the decimal point.<br>0000 = 0<br>1111 = 15                                                                                                                                                                                           |
| 13  | Decimal Place (Bit 1)      |                                                                                                                                                                                                                                                                        |
| 14  | Decimal Place (Bit 2)      |                                                                                                                                                                                                                                                                        |
| 15  | Decimal Place (Bit 3)      |                                                                                                                                                                                                                                                                        |
| 16  | Extended Data Type (Bit 4) | Right bit is least significant bit (16).                                                                                                                                                                                                                               |
| 17  | Extended Data Type (Bit 5) | 000 = Reserved                                                                                                                                                                                                                                                         |
| 18  | Extended Data Type (Bit 6) | 001 = DWORD used as an array of Boolean<br>010 = Reserved<br>011 = Reserved<br>100 = Reserved<br>101 = Reserved<br>110 = Reserved<br>111 = Reserved                                                                                                                    |
| 19  | Parameter Exists           | Used to mark parameters that are not available to network tools.                                                                                                                                                                                                       |
| 20  | Not Used                   | Reserved                                                                                                                                                                                                                                                               |
| 21  | Formula Links              | Indicates the Formula Data is derived from other parameters.                                                                                                                                                                                                           |
| 22  | Access Level (Bit 1)       | A 3-bit field used to control access to parameter data.                                                                                                                                                                                                                |
| 23  | Access Level (Bit 2)       |                                                                                                                                                                                                                                                                        |
| 24  | Access Level (Bit 3)       |                                                                                                                                                                                                                                                                        |
| 25  | Writable ENUM              | ENUM text: 0 = Read Only, 1 = Read/Write                                                                                                                                                                                                                               |
| 26  | Not a Link Source          | 0 = May be the source end of a link<br>1 = May not be the source end of a link                                                                                                                                                                                         |
| 27  | Enhanced Bit ENUM          | Parameter supports enhanced bit ENUMs.                                                                                                                                                                                                                                 |
| 28  | Enhanced ENUM              | Parameter supports enhanced ENUMs.                                                                                                                                                                                                                                     |
| 29  | Uses DPI Limits Object     | Parameter uses the DPI Limits Object.                                                                                                                                                                                                                                  |
| 30  | Extended Descriptor        | Parameter uses Extended Descriptor bits, which can be obtained by reading the DPI Extended Descriptor attribute for this parameter.                                                                                                                                    |
| 31  | Always Upload/Download     | Parameter shall always be included in uploads and downloads.                                                                                                                                                                                                           |

## Extended Descriptor Attributes

| Bit | Name                          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0   | Indirect Mode                 | 0 = Analog (selects entire parameters)<br>1 = Digital (selects individual bits within parameters)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 1   | Indirect Type 0               | Analog input list (Instance 0xFFFF)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 2   | Indirect Type 1               | Digital input list (Instance 0xFFFE)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 3   | Indirect Type 2               | Feedback list (Instance 0xFFFD)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 4   | Indirect Type 3               | Analog output list (Instance 0xFFFC)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 5   | Indirect Type 4               | Digital output list (Instance 0xFFFB)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 6   | Indirect Type 5               | Undefined (Instance 0xFFFA)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 7   | Indirect Type 6               | Undefined (Instance 0xFFFF9)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 8   | Indirect Type 7               | Undefined (Instance 0xFFFF8)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 9   | Indirect Type 8               | Undefined (Instance 0xFFFF7)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 10  | Indirect Type 9               | Undefined (Instance 0xFFFF6)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 11  | Indirect Type 10              | Undefined (Instance 0xFFFF5)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 12  | Indirect Type 11              | Undefined (Instance 0xFFFF4)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 13  | Indirect Type 12              | Undefined (Instance 0xFFFF3)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 14  | Indirect Type 13              | Undefined (Instance 0xFFFF2)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 15  | Indirect Type 14              | Parameter-specific list                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 16  | FP Max Decimals Bit 0         | These four bits are used on REAL parameters only. They indicate the maximum number of decimal places to be displayed for small values. A value of 0 indicates to not limit the number of decimal places used.                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 17  | FP Max Decimals Bit 1         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 18  | FP Max Decimals Bit 2         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 19  | FP Max Decimals Bit 1         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 20  | Extended Parameter Reference  | 0 = Not an Extended Parameter Reference<br>1 = Extended Parameter Reference<br>An Extended Parameter Reference contains a reference to another parameter. The value is formatted the same as an analog mode Indirect Selector parameter (SSpppp, where SS = slot number of device to which this Extended Parameter Reference is pointing, and pppp = number of the parameter or diagnostic item to which this Extended Parameter Reference is pointing). Note that an Extended Parameter Reference can only select parameters unlike an Indirect Selector. An Extended Parameter Reference could be used to configure a Datalink or show the source of a Reference (among other uses). |
| 21  | Uses Rating Table Object      | This parameter has rating-dependent defaults and limits that can be obtained from the Rating Table Object. The Offline Read Full will include the default value for the smallest rating and limits that will accommodate the full range of values allowed in the family of devices using this particular combination of Family Code and Config Code. The Online Read Full will include the rating-dependent default and limit values for this particular combination of Family Code, Config Code, and Rating Code.                                                                                                                                                                     |
| 22  | Writable Referenced Parameter | This bit must be zero unless the parameter is an Extended Parameter Reference. If the parameter is an Extended Parameter Reference, then:<br>0 = The referenced parameter may be read-only or writable.<br>1 = The referenced parameter must always be writable (including while running).                                                                                                                                                                                                                                                                                                                                                                                             |
| 23  | Disallow Zero                 | This bit must be zero unless the parameter is an Indirect Selector or Extended Parameter Reference. If the parameter is an Indirect Selector or Extended Parameter Reference, then:<br>0 = Allow zero<br>1 = Disallow zero<br>If this bit is cleared (indicating that a value of zero is allowed), the device must support the "Zero Text" parameter attribute so that a software tool or HIM can obtain text from the Zero Text parameter attribute.<br>If this bit is set (indicating that a value of zero is disallowed), a software tool or HIM will not allow the user to enter a value of zero.                                                                                  |
| 24  | Datalink Out                  | This bit is used by offline tools and indicates that this is a Datalink Out parameter. Bit 20 must also be set.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 25  | Datalink In                   | This bit is used by offline tools and indicates that this is a Datalink In parameter. Bits 20 and 22 must also be set.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 26  | Not Writable While IO Active  | This parameter cannot be written if the I/O data being exchanged between the Host and the peripheral is valid.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

| Bit   | Name                     | Description                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 27    | Command Parameter        | This parameter commands the drive to take an action, such as “Reset Defaults” or “Autotune,” and then returns to a value of zero. Offline software tools will not allow setting this parameter to anything other than a value of zero. If an offline file contains a Command Parameter with a non-zero value, the offline software tool will change the value to zero. Note that command parameters cannot have values that do not return to zero. |
| 28    | Current Value Is Default | This bit identifies a parameter that will not change if a “Reset Defaults” is commanded. For example, if a drive contains a Language parameter that is set to German, setting defaults will leave the parameter set to German. Likewise, if the parameter is set to French, setting defaults will leave the parameter set to French.                                                                                                               |
| 29    | Use Zero Text            | If the “Disallow Zero” bit is set, this bit must be cleared. If the “Disallow Zero” bit is cleared, then:<br>0 = Use Disabled Text parameter class attribute.<br>1 = Use Zero Text parameter instance attribute.                                                                                                                                                                                                                                   |
| 30-31 | Reserved                 | Reserved                                                                                                                                                                                                                                                                                                                                                                                                                                           |

## Formulas for Converting

Display Value = ((Internal Value + Offset) x Multiplier x Base) / (Divisor x 10<sup>Decimal Places</sup>)

Internal Value = ((Display Value x Divisor x 10<sup>Decimal Places</sup>) / (Multiplier x Base)) - Offset

## Common Services

| Service Code | Implemented for: |          | Service Name         |
|--------------|------------------|----------|----------------------|
|              | Class            | Instance |                      |
| 0x0E         | Yes              | Yes      | Get_Attribute_Single |
| 0x10         | Yes              | Yes      | Set_Attribute_Single |

## Object Specific Services

| Service Code        | Implemented for: |          | Service Name             | Allocation Size (in bytes) |            |
|---------------------|------------------|----------|--------------------------|----------------------------|------------|
|                     | Class            | Instance |                          | Par. Number                | Par. Value |
| 0x4B                | Yes              | No       | Get_Attributes_Scattered | 2                          | 2          |
| 0x4C                | Yes              | No       | Set_Attributes_Scattered | 2                          | 2          |
| 0x4D <sup>(1)</sup> | Yes              | No       | Get_Attributes_Scattered | 4                          | 4          |
| 0x4E <sup>(1)</sup> | Yes              | No       | Set_Attributes_Scattered | 4                          | 4          |

<sup>(1)</sup> These services are supported only when the adapter is used with a PowerFlex 750-Series drive.

The table below lists the parameters for the Get\_Attributes\_Scattered and Set\_Attributes\_Scattered object-specific service:

| Name             | Data Type | Description                                          |
|------------------|-----------|------------------------------------------------------|
| Parameter Number | DWORD     | Parameter to read or write                           |
| Parameter Value  | DWORD     | Parameter value to read or write (zero when reading) |

## DPI Fault Object

### Class Code

| Hexadecimal | Decimal |
|-------------|---------|
| 0x97        | 151     |

Products such as PowerFlex drives use this object for faults. Adapters use this object for events.

### Services

| Service Code | Implemented for: |          | Service Name         |
|--------------|------------------|----------|----------------------|
|              | Class            | Instance |                      |
| 0x0E         | Yes              | Yes      | Get_Attribute_Single |
| 0x10         | Yes              | Yes      | Set_Attribute_Single |

### Instances

The number of instances depends on the maximum number of faults or events supported in the queue. The maximum number of faults/events can be read in Instance 0, Attribute 2.

| Instances (Hex.)               | (Dec.)        | Device      | Example | Description                    |
|--------------------------------|---------------|-------------|---------|--------------------------------|
| 0x0000...0x3FFF                | 0...16383     | Host        | 0       | Class Attributes (Drive)       |
| 0x4000...0x43FF                | 16384...17407 | Adapter     | 1       | Most Recent Drive Fault        |
| 0x4400...0x47FF                | 17408...18431 | DPI Port 1  | 2       | Second Most Recent Drive Fault |
| 0x4800...0x4BFF                | 18432...19455 | DPI Port 2  | :       | :                              |
| 0x4C00...0x4FFF                | 19456...20479 | DPI Port 3  | 16384   | Class Attributes (Adapter)     |
| 0x5000...0x53FF                | 20480...21503 | DPI Port 4  | 16385   | Most Recent Adapter Event      |
| 0x5400...0x57FF                | 21504...22527 | DPI Port 5  | :       | :                              |
| 0x5800...0x5BFF                | 22528...23551 | DPI Port 6  |         |                                |
| 0x5C00...0x5FFF <sup>(1)</sup> | 23552...24575 | DPI Port 7  |         |                                |
| 0x6000...0x63FF <sup>(1)</sup> | 24576...25599 | DPI Port 8  |         |                                |
| 0x6400...0x67FF <sup>(1)</sup> | 25600...26623 | DPI Port 9  |         |                                |
| 0x6800...0x6BFF <sup>(1)</sup> | 26624...27647 | DPI Port 10 |         |                                |
| 0x6C00...0x6FFF <sup>(1)</sup> | 27648...28671 | DPI Port 11 |         |                                |
| 0x7000...0x73FF <sup>(1)</sup> | 28672...29695 | DPI Port 12 |         |                                |
| 0x7400...0x77FF <sup>(1)</sup> | 29696...30719 | DPI Port 13 |         |                                |
| 0x7800...0x7BFF <sup>(1)</sup> | 30720...31743 | DPI Port 14 |         |                                |

<sup>(1)</sup> These instances are supported only when the adapter is used with a PowerFlex 750-Series drive.

### Class Attributes

| Attribute ID | Access Rule | Name                     | Data Type | Description                                                                                  |
|--------------|-------------|--------------------------|-----------|----------------------------------------------------------------------------------------------|
| 1            | Get         | Class Revision           | WORD      | Revision of object                                                                           |
| 2            | Get         | Number of Instances      | WORD      | Maximum number of faults/events that the device can record in its queue                      |
| 3            | Set         | Fault Command Write      | BYTE      | 0 = No Operation<br>1 = Clear Fault/Event<br>2 = Clear Fault/Event Queue<br>3 = Reset Device |
| 4            | Get         | Fault Trip Instance Read | WORD      | Fault that tripped the device. For adapters, this value is always 1 when faulted.            |

| Attribute ID | Access Rule | Name                      | Data Type                             | Description                                                                     |
|--------------|-------------|---------------------------|---------------------------------------|---------------------------------------------------------------------------------|
| 5            | Get         | Fault Data List           | STRUCT of:<br>BYTE<br>BYTE<br>WORD[n] | Number of faults/events in the queue. A "0" indicates the fault queue is empty. |
| 6            | Get         | Number of Recorded Faults | WORD                                  | Number of faults/events in the queue. A "0" indicates the fault queue is empty. |
| 7            | Get         | Fault Parameter Reference | WORD                                  | Number of faults/events in the queue. A "0" indicates the fault queue is empty. |

### Instance Attributes

| Attribute ID | Access Rule | Name                     | Data Type                                                                                                                 | Description                                                                                                                                                                                                                                                                           |
|--------------|-------------|--------------------------|---------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0            | Get         | Full/All Information     | STRUCT of WORD<br>STRUCT of:<br>BYTE<br>BYTE<br>STRING[16]<br>STRUCT of:<br>LWORD<br>BOOL[16]<br><br>WORD<br>CONTAINER[n] | Fault code<br>Fault source<br>DPI port<br>DPI Device Object<br>Fault text<br>Fault time stamp<br>Timer value (0 = timer not supported)<br>BOOL[0]: (0 = invalid data, 1 = valid data)<br>BOOL[1]: (0 = elapsed time, 1 = real time)<br>BOOL[2...15]: Not used<br>Reserved<br>Reserved |
| 1            | Get         | Basic Information        | STRUCT of WORD<br>STRUCT of:<br>BYTE<br>BYTE<br>STRUCT of:<br>LWORD<br>BOOL[16]                                           | Fault code<br>Fault source<br>DPI port<br>DPI Device Object<br>Fault time stamp<br>Timer value (0 = timer not supported)<br>BOOL[0]: (0 = invalid data, 1 = valid data)<br>BOOL[1]: (0 = elapsed time, 1 = real time)<br>BOOL[2...15]: Not used                                       |
| 2            | Get         | International Fault Text | STRINGN                                                                                                                   | Text describing the fault with support for Unicode.                                                                                                                                                                                                                                   |

## DPI Alarm Object

### Class Code

| Hexadecimal | Decimal |
|-------------|---------|
| 0x98        | 152     |

Products such as PowerFlex drives use this object for alarms or warnings. Adapters do not support this object.

### Services

| Service Code | Implemented for: |          | Service Name         |
|--------------|------------------|----------|----------------------|
|              | Class            | Instance |                      |
| 0x0E         | Yes              | Yes      | Get_Attribute_Single |
| 0x10         | Yes              | Yes      | Set_Attribute_Single |

### Instances

The number of instances depends on the maximum number of alarms supported by the queue. The maximum number of alarms can be read in Instance 0, Attribute 2.

| Instances (Hex.) | (Dec.)    | Device |
|------------------|-----------|--------|
| 0x0000...0x3FFF  | 0...16383 | Host   |

Only host devices can have alarms.

| Example | Description              |
|---------|--------------------------|
| 0       | Class Attributes (Drive) |
| 1       | Most Recent Alarm        |
| 2       | Second Most Recent Alarm |
| ⋮       | ⋮                        |

### Class Attributes

| Attribute ID | Access Rule | Name                      | Data Type                             | Description                                                                      |
|--------------|-------------|---------------------------|---------------------------------------|----------------------------------------------------------------------------------|
| 1            | Get         | Class Revision            | WORD                                  | Revision of object                                                               |
| 2            | Get         | Number of Instances       | WORD                                  | Maximum number of alarms that the device can record in its queue                 |
| 3            | Set         | Alarm Command Write       | BYTE                                  | 0 = No Operation<br>1 = Clear Alarm<br>2 = Clear Alarm Queue<br>3 = Reset Device |
| 4            | Get         | Fault Data List           | STRUCT of:<br>BYTE<br>BYTE<br>WORD[n] | Reserved                                                                         |
| 5            | Get         | Number of Recorded Alarms | WORD                                  | Number of alarms in the queue. A "0" indicates the alarm queue is empty.         |

### Instance Attributes

| Attribute ID | Access Rule | Name                     | Data Type                                                                                                                 | Description                                                                                                                                                                                                                                                                          |
|--------------|-------------|--------------------------|---------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0            | Get         | Full/All Information     | STRUCT of WORD<br>STRUCT of:<br>BYTE<br>BYTE<br>STRING[16]<br>STRUCT of:<br>LWORD<br>BOOL[16]<br><br>WORD<br>CONTAINER[n] | Alarm code<br>Alarm source<br>DPI port<br>DPI Device Object<br>Alarm text<br>Alarm time stamp<br>Timer value (0 = timer not supported)<br>BOOL[0]: (0 = invalid data, 1 = valid data)<br>BOOL[1]: (0 = elapsed time, 1 = real time)<br>BOOL[2...15] Reserved<br>Reserved<br>Reserved |
| 1            | Get         | Basic Information        | STRUCT of WORD<br>STRUCT of:<br>BYTE<br>BYTE<br>STRUCT of:<br>LWORD<br>BOOL[16]                                           | Alarm code<br>Alarm source<br>DPI port<br>DPI Device Object<br>Alarm time stamp<br>Timer value (0 = timer not supported)<br>BOOL[0]: (0 = invalid data, 1 = valid data)<br>BOOL[1]: (0 = elapsed time, 1 = real time)<br>BOOL[2...15] Reserved                                       |
| 2            | Get         | International Alarm Text | STRINGN                                                                                                                   | Text describing the alarm with support for Unicode.                                                                                                                                                                                                                                  |

## DPI Diagnostic Object

### Class Code

| Hexadecimal | Decimal |
|-------------|---------|
| 0x99        | 153     |

### Services

| Service Code | Implemented for: |          | Service Name         |
|--------------|------------------|----------|----------------------|
|              | Class            | Instance |                      |
| 0x0E         | Yes              | Yes      | Get_Attribute_Single |
| 0x10         | Yes              | Yes      | Set_Attribute_Single |

### Instances

The number of instances depends on the maximum number of diagnostic items in the device. The total number of diagnostic items can be read in Instance 0, Attribute 2.

| Instances (Hex.)               | (Dec.)        | Device      | Example | Description                |
|--------------------------------|---------------|-------------|---------|----------------------------|
| 0x0000...0x3FFF                | 0...16383     | Host        | 0       | Class Attributes (Drive)   |
| 0x4000...0x43FF                | 16384...17407 | Adapter     | 1       | Drive Diagnostic Item 1    |
| 0x4400...0x47FF                | 17408...18431 | DPI Port 1  | 2       | Drive Diagnostic Item 2    |
| 0x4800...0x4BFF                | 18432...19455 | DPI Port 2  | :       | :                          |
| 0x4C00...0x4FFF                | 19456...20479 | DPI Port 3  | 16384   | Class Attributes (Adapter) |
| 0x5000...0x53FF                | 20480...21503 | DPI Port 4  | 16385   | Adapter Diagnostic Item1   |
| 0x5400...0x57FF                | 21504...22527 | DPI Port 5  | :       | :                          |
| 0x5800...0x5BFF                | 22528...23551 | DPI Port 6  |         |                            |
| 0x5C00...0x5FFF <sup>(1)</sup> | 23552...24575 | DPI Port 7  |         |                            |
| 0x6000...0x63FF <sup>(1)</sup> | 24576...25599 | DPI Port 8  |         |                            |
| 0x6400...0x67FF <sup>(1)</sup> | 25600...26623 | DPI Port 9  |         |                            |
| 0x6800...0x6BFF <sup>(1)</sup> | 26624...27647 | DPI Port 10 |         |                            |
| 0x6C00...0x6FFF <sup>(1)</sup> | 27648...28671 | DPI Port 11 |         |                            |
| 0x7000...0x73FF <sup>(1)</sup> | 28672...29695 | DPI Port 12 |         |                            |
| 0x7400...0x77FF <sup>(1)</sup> | 29696...30719 | DPI Port 13 |         |                            |
| 0x7800...0x7BFF <sup>(1)</sup> | 30720...31743 | DPI Port 14 |         |                            |

<sup>(1)</sup> These instances are supported only when the adapter is used with a PowerFlex 750-Series drive.

### Class Attributes

| Attribute ID | Access Rule | Name                | Data Type | Description                               |
|--------------|-------------|---------------------|-----------|-------------------------------------------|
| 1            | Get         | Class Revision      | WORD      | 1                                         |
| 2            | Get         | Number of Instances | WORD      | Number of diagnostic items in the device. |
| 3            | Get         | ENUM Offset         | WORD      | DPI ENUM object instance offset           |

## Instance Attributes

| Attribute ID | Access Rule | Name                               | Data Type                                                                                                                                                                    | Description                                                                                                                                                                                                                                                                                                                                |
|--------------|-------------|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0            | Get         | Full/All Information               | STRUCT of:<br>BOOL[32]<br>CONTAINER <sup>(1)</sup><br>CONTAINER<br>CONTAINER<br>CONTAINER<br>WORD<br>WORD<br>STRING[4]<br>WORD<br>WORD<br>WORD<br>INT<br>DWORD<br>STRING[16] | Descriptor (see page <a href="#">C-19</a> )<br>Value<br>Minimum value<br>Maximum value<br>Default value<br>Pad Word<br>Pad Word<br>Units (for example, Amp, Hz)<br>Multiplier <sup>(2)</sup><br>Divisor <sup>(2)</sup><br>Base <sup>(2)</sup><br>Offset <sup>(2)</sup><br>Link (source of the value) (0 = no link)<br>Diagnostic name text |
| 1            | Get/Set     | Value                              | Various                                                                                                                                                                      | Diagnostic item value                                                                                                                                                                                                                                                                                                                      |
| 2            | Get         | International Diagnostic Item Text | STRUCT of:<br>STRINGN<br>STRINGN                                                                                                                                             | Diagnostic name text<br>Diagnostic units text                                                                                                                                                                                                                                                                                              |
| 3            | Get         | International Full Read All        | STRUCT of:<br>BOOL[32]<br>CONTAINER<br>CONTAINER<br>CONTAINER<br>CONTAINER<br>WORD<br>WORD<br>WORD<br>WORD<br>WORD<br>WORD<br>INT<br>DWORD<br>BOOL[32]<br>STRINGN<br>STRINGN | Descriptor<br>Value<br>Minimum<br>Maximum<br>Default<br>Pad Word<br>Pad Word<br>Multiplier<br>Divisor<br>Base<br>Offset<br>Pad<br>Extended descriptor<br>Diagnostic name text<br>Diagnostic units text                                                                                                                                     |

<sup>(1)</sup> A CONTAINER is a 32-bit block of data that contains the data type used by a value. If signed, the value is sign extended. Padding is used in the CONTAINER to ensure that it is always 32-bits.

<sup>(2)</sup> This value is used in the formulas used to convert the value between display units and internal units. Refer to [Formulas for Converting on page C-21](#).

## DPI Time Object

### Class Code

| Hexadecimal | Decimal |
|-------------|---------|
| 0x9B        | 155     |

### Services

| Service Code | Implemented for: |          | Service Name         |
|--------------|------------------|----------|----------------------|
|              | Class            | Instance |                      |
| 0x0E         | Yes              | Yes      | Get_Attribute_Single |
| 0x10         | Yes              | Yes      | Set_Attribute_Single |

### Instances

The number of instances depends on the number of timers in the device. Instance 1 is always reserved for a real-time clock although a device may not support it. The total number of timers can be read in Instance 0, Attribute 2.

| Instances (Hex.)               | (Dec.)        | Device      | Example | Description                                            |
|--------------------------------|---------------|-------------|---------|--------------------------------------------------------|
| 0x0000...0x3FFF                | 0...16383     | Host        | 0       | Class Attributes (Drive)                               |
| 0x4000...0x43FF                | 16384...17407 | Adapter     | 1       | Real Time Clock (Predefined)<br>(not always supported) |
| 0x4400...0x47FF                | 17408...18431 | DPI Port 1  | 2       | Timer 1                                                |
| 0x4800...0x4BFF                | 18432...19455 | DPI Port 2  | 3       | Timer 2                                                |
| 0x4C00...0x4FFF                | 19456...20479 | DPI Port 3  | ⋮       | ⋮                                                      |
| 0x5000...0x53FF                | 20480...21503 | DPI Port 4  |         |                                                        |
| 0x5400...0x57FF                | 21504...22527 | DPI Port 5  |         |                                                        |
| 0x5800...0x5BFF                | 22528...23551 | DPI Port 6  |         |                                                        |
| 0x5C00...0x5FFF <sup>(1)</sup> | 23552...24575 | DPI Port 7  |         |                                                        |
| 0x6000...0x63FF <sup>(1)</sup> | 24576...25599 | DPI Port 8  |         |                                                        |
| 0x6400...0x67FF <sup>(1)</sup> | 25600...26623 | DPI Port 9  |         |                                                        |
| 0x6800...0x6BFF <sup>(1)</sup> | 26624...27647 | DPI Port 10 |         |                                                        |
| 0x6C00...0x6FFF <sup>(1)</sup> | 27648...28671 | DPI Port 11 |         |                                                        |
| 0x7000...0x73FF <sup>(1)</sup> | 28672...29695 | DPI Port 12 |         |                                                        |
| 0x7400...0x77FF <sup>(1)</sup> | 29696...30719 | DPI Port 13 |         |                                                        |
| 0x7800...0x7BFF <sup>(1)</sup> | 30720...31743 | DPI Port 14 |         |                                                        |

<sup>(1)</sup> These instances are supported only when the adapter is used with a PowerFlex 750-Series drive.

### Class Attributes

| Attribute ID | Access Rule | Name                           | Data Type | Description                                                                                       |
|--------------|-------------|--------------------------------|-----------|---------------------------------------------------------------------------------------------------|
| 1            | Get         | Class Revision                 | WORD      | Revision of object                                                                                |
| 2            | Get         | Number of Instances            | WORD      | Number of timers in the object, excluding the real-time clock that is predefined.                 |
| 3            | Get         | First Device Specific Timer    | WORD      | Instance of the first timer that is not predefined.                                               |
| 4            | Set         | Time Command Write             | BYTE      | 0 = No Operation<br>1 = Clear all timers (Does not clear the real-time clock or read only timers) |
| 5            | Get         | Number of Supported Time Zones | WORD      | Number of time zones described in the Time Zone List attribute.                                   |
| 6            | Get         | Time Zone List                 | STRUCT    | Identifies a time zone.                                                                           |
| 7            | Get/Set     | Active Time Zone ID            | WORD      | The ID field of the Time Zone List structure for the desired time zone.                           |

| Attribute ID | Access Rule | Name                  | Data Type                                                                                                                | Description                                                                                                                                                                                                                                                          |
|--------------|-------------|-----------------------|--------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 8            | Get         | Active Time Zone Data | STRUCT of:<br>INT<br>BYTE<br>BYTE<br>BYTE<br>BYTE<br>BYTE<br>BYTE<br>INT<br>BYTE<br>BYTE<br>BYTE<br>BYTE<br>BYTE<br>BYTE | Standard bias<br>Standard month<br>Standard day of week<br>Standard week<br>Standard hour<br>Standard minute<br>Standard second<br>Daylight offset<br>Daylight month<br>Daylight day of week<br>Daylight week<br>Daylight hour<br>Daylight minute<br>Daylight second |
| 9            | Get/Set     | Custom Time Zone Data | STRUCT of:<br>INT<br>BYTE<br>BYTE<br>BYTE<br>BYTE<br>BYTE<br>BYTE<br>INT<br>BYTE<br>BYTE<br>BYTE<br>BYTE<br>BYTE<br>BYTE | Standard bias<br>Standard month<br>Standard day of week<br>Standard week<br>Standard hour<br>Standard minute<br>Standard second<br>Daylight offset<br>Daylight month<br>Daylight day of week<br>Daylight week<br>Daylight hour<br>Daylight minute<br>Daylight second |

### Instance Attributes

| Attribute ID | Access Rule | Name                     | Data Type                                                                           | Description                                                                                                                                                                                                                                                    |
|--------------|-------------|--------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0            | Get         | Read Full                | STRUCT of:<br>STRING[16]<br>LWORD or<br>STRUCT<br>BOOL[16]                          | Name of the timer<br>Elapsed time in milliseconds unless timer is a real-time clock (see attribute 2)<br>See attribute 3                                                                                                                                       |
| 1            | Get         | Timer Text               | STRING[16]                                                                          | Name of the timer                                                                                                                                                                                                                                              |
| 2            | Get/Set     | Timer Value              | LWORD<br>-or-<br>STRUCT of:<br>WORD<br>BYTE<br>BYTE<br>BYTE<br>BYTE<br>BYTE<br>BYTE | Elapsed time in milliseconds unless the timer is a real-time clock.<br>Real-Time Clock Data:<br>Milliseconds (0...999)<br>Seconds (0...59)<br>Minutes (0...59)<br>Hours (0...23)<br>Days (1...31)<br>Months (1 = January, 12 = December)<br>Years (since 1972) |
| 3            | Get         | Timer Descriptor         | BOOL[16]                                                                            | BOOL[0]: (0 = invalid data, 1 = valid data)<br>BOOL[1]: (0 = elapsed time, 1 = real time)<br>BOOL[2...15]: Not used                                                                                                                                            |
| 4            | Get         | International Read Full  | STRUCT of:<br>STRINGN<br>STRUCT<br>BOOL[16]                                         | International timer text<br>Timer value<br>Timer descriptor                                                                                                                                                                                                    |
| 5            | Get         | International Timer Text | STRINGN                                                                             | Name of this timer                                                                                                                                                                                                                                             |
| 6            | Get         | Clock Status             | BOOL[32]                                                                            | Identifies clock status                                                                                                                                                                                                                                        |
| 8            | Get/Set     | Number of Leap Seconds   | INT                                                                                 | Identifies the current number of Leap Seconds.                                                                                                                                                                                                                 |
| 9            | Get         | Clock Options            | BOOL[32]                                                                            | Identifies the optional functionality available in the device's System Clock.                                                                                                                                                                                  |
| 10           | Get/Set     | Clock Options Enable     | BOOL[32]                                                                            | Identifies which of the clock's options are enabled.                                                                                                                                                                                                           |

## Host DPI Parameter Object Class Code

| Hexadecimal | Decimal |
|-------------|---------|
| 0x9F        | 159     |

To access Device parameters, use the DPI Parameter Object (Class Code 0x93).

**Important:** The Host DPI Parameter Object is supported only when the adapter is used with a PowerFlex 750-Series drive.

### Instances

The number of instances depends on the number of parameters in the device. The total number of parameters can be read in Instance 0, Attribute 0.

| Instances (Hex.) | (Dec.)        | Device      | Example | Description                    |
|------------------|---------------|-------------|---------|--------------------------------|
| 0x0000...0x3FFF  | 0...16383     | Reserved    | 16384   | Class Attributes (Adapter)     |
| 0x4000...0x43FF  | 16384...17407 | Adapter     | 16385   | Adapter Parameter 1 Attributes |
| 0x4400...0x47FF  | 17408...18431 | DPI Port 1  | 16386   | Adapter Parameter 2 Attributes |
| 0x4800...0x4BFF  | 18432...19455 | DPI Port 2  | :       | :                              |
| 0x4C00...0x4FFF  | 19456...20479 | DPI Port 3  | 17408   | Class Attributes (HIM)         |
| 0x5000...0x53FF  | 20480...21503 | DPI Port 4  | 17409   | HIM Parameter 1 Attributes     |
| 0x5400...0x57FF  | 21504...22527 | DPI Port 5  | 17410   | HIM Parameter 2 Attributes     |
| 0x5800...0x5BFF  | 22528...23551 | DPI Port 6  | :       | :                              |
| 0x5C00...0x5FFF  | 23552...24575 | DPI Port 7  |         |                                |
| 0x6000...0x63FF  | 24576...25599 | DPI Port 8  |         |                                |
| 0x6400...0x67FF  | 25600...26623 | DPI Port 9  |         |                                |
| 0x6800...0x6BFF  | 26624...27647 | DPI Port 10 |         |                                |
| 0x6C00...0x6FFF  | 27648...28671 | DPI Port 11 |         |                                |
| 0x7000...0x73FF  | 28672...29695 | DPI Port 12 |         |                                |
| 0x7400...0x77FF  | 29696...30719 | DPI Port 13 |         |                                |
| 0x7800...0x7BFF  | 30720...31743 | DPI Port 14 |         |                                |

### Class Attributes

| Attribute ID | Access Rule | Name                             | Data Type | Description                                                                                                                                         |
|--------------|-------------|----------------------------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| 0            | Get         | Number of Instances              | WORD      | Number of parameters in the device                                                                                                                  |
| 1            | Set         | Write Protect Password           | WORD      | 0 = Password disabled<br>n = Password                                                                                                               |
| 2            | Set         | NVS Command Write                | BYTE      | 0 = No Operation<br>1 = Store values in active memory to NVS<br>2 = Load values in NVS to active memory<br>3 = Load default values to active memory |
| 3            | Get         | NVS Parameter Value Checksum     | WORD      | Checksum of all parameter values in a user set in NVS                                                                                               |
| 4            | Get         | NVS Link Value Checksum          | WORD      | Checksum of parameter links in a user set in NVS                                                                                                    |
| 5            | Get         | First Accessible Parameter       | WORD      | First parameter available if parameters are protected by passwords. A "0" indicates all parameters are protected.                                   |
| 7            | Get         | Class Revision                   | WORD      | 2 = DPI                                                                                                                                             |
| 8            | Get         | First Parameter Processing Error | WORD      | The first parameter that has been written with a value outside of its range. A "0" indicates no errors.                                             |
| 9            | Set         | Link Command                     | BYTE      | 0 = No Operation<br>1 = Clear All Parameter Links (This does not clear links to function blocks.)                                                   |

## Instance Attributes

| Attribute ID | Access Rule | Name                       | Data Type                                                                                                                                                                                                                            | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|--------------|-------------|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6            | Get         | DPI Offline Read Full      | STRUCT of:<br>BOOL[32]<br>CONTAINER<br>CONTAINER<br>CONTAINER<br>STRING[16]<br>STRING[4]<br>WORD<br>WORD<br>WORD<br>WORD<br>WORD<br>WORD<br>WORD<br>WORD<br>BYTE<br>BYTE<br>WORD<br>WORD<br>CONTAINER<br>WORD<br>WORD<br>WORD<br>INT | Descriptor<br>Offline Minimum value<br>Offline Maximum value<br>Offline Default value<br>Parameter name<br>Offline parameter units<br>Online minimum parameter instance<br>Online maximum parameter instance<br>Online default parameter instance<br>Multiplier parameter instance<br>Divisor parameter instance<br>Base parameter instance<br>Offset parameter instance<br>Formula number<br>Pad byte (always zero)<br>Help instance<br>Pad word (always a value of zero)<br>Parameter value<br>Multiplier<br>Divisor<br>Base<br>Offset |
| 7            | Get         | DPI Online Read Full       | STRUCT of:<br>BOOL[32]<br>CONTAINER <sup>(1)</sup><br>CONTAINER<br>CONTAINER<br>CONTAINER<br>WORD<br>WORD<br>STRING[4]<br>WORD<br>WORD<br>WORD<br>WORD<br>INT<br>BYTE[3]<br>BYTE<br>STRING[16]                                       | Descriptor (see <a href="#">page C-33</a> )<br>Parameter value<br>Minimum value<br>Maximum value<br>Default value<br>Next parameter<br>Previous parameter<br>Units (for example, Amps, Hz)<br>Multiplier <sup>(2)</sup><br>Divisor <sup>(2)</sup><br>Base <sup>(2)</sup><br>Offset <sup>(2)</sup><br>Link (source of the value) (0 = no link)<br>Always zero (0)<br>Parameter name                                                                                                                                                       |
| 8            | Get         | DPI Descriptor             | BOOL[32]                                                                                                                                                                                                                             | Descriptor (see <a href="#">page C-33</a> )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 9            | Get/Set     | DPI Parameter Value        | Various                                                                                                                                                                                                                              | Parameter value in NVS. <sup>(3)</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 10           | Get/Set     | DPI RAM Parameter Value    | Various                                                                                                                                                                                                                              | Parameter value in temporary memory. Valid only for DPI drives.                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 11           | Get/Set     | DPI Link                   | BYTE[3]                                                                                                                                                                                                                              | Link (parameter or function block that is the source of the value) (0 = no link)                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 12           | Get         | Help Object Instance       | WORD                                                                                                                                                                                                                                 | ID for help text for this parameter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 13           | Get         | DPI Read Basic             | STRUCT of:<br>BOOL[32]<br>CONTAINER<br>CONTAINER<br>CONTAINER<br>CONTAINER<br>STRING[16]<br>STRING[4]                                                                                                                                | Descriptor (see <a href="#">page C-33</a> )<br>Parameter value<br>Minimum value<br>Maximum value<br>Default value<br>Parameter name<br>Units (for example, Amps, Hz)                                                                                                                                                                                                                                                                                                                                                                     |
| 14           | Get         | DPI Parameter Name         | STRING[16]                                                                                                                                                                                                                           | Parameter name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 15           | Get         | DPI Parameter Alias        | STRING[16]                                                                                                                                                                                                                           | Customer supplied parameter name.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 16           | Get         | Parameter Processing Error | BYTE                                                                                                                                                                                                                                 | 0 = No error<br>1 = Value is less than the minimum<br>2 = Value is greater than the maximum                                                                                                                                                                                                                                                                                                                                                                                                                                              |

[illegible]

- (1) A CONTAINER is a 32-bit block of data that contains the data type used by a parameter value. If signed, the value is sign extended. Padding is used in the CONTAINER to ensure that it is always 32-bits.
- (2) This value is used in the formulas used to convert the parameter value between display units and internal units. Refer to [Formulas for Converting on page C-35](#).
- (3) Do NOT continually write parameter data to NVS. Refer to the attention on [page 6-1](#).

## Descriptor Attributes

| Bit | Name                       | Description                                                                                                                                                                                                                                                              |
|-----|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0   | Data Type (Bit 1)          | Right bit is least significant bit (0).                                                                                                                                                                                                                                  |
| 1   | Data Type (Bit 2)          | 000 = USINT used as an array of Boolean                                                                                                                                                                                                                                  |
| 2   | Data Type (Bit 3)          | 001 = UINT used as an array of Boolean<br>010 = USINT (8-bit integer)<br>011 = UINT (16-bit integer)<br>100 = UDINT (32-bit integer)<br>101 = TCHAR ((8-bit (not Unicode) or 16-bits (Unicode))<br>110 = REAL (32-bit floating point value)<br>111 = Use bits 16, 17, 18 |
| 3   | Sign Type                  | 0 = unsigned<br>1 = signed                                                                                                                                                                                                                                               |
| 4   | Hidden                     | 0 = visible<br>1 = hidden                                                                                                                                                                                                                                                |
| 5   | Not a Link Sink            | 0 = May be the sink end of a link<br>1 = May not be the sink end of a link                                                                                                                                                                                               |
| 6   | Not Recallable             | 0 = Recallable from NVS<br>1 = Not Recallable from NVS                                                                                                                                                                                                                   |
| 7   | ENUM                       | 0 = No ENUM text<br>1 = ENUM text                                                                                                                                                                                                                                        |
| 8   | Writable                   | 0 = Read only<br>1 = Read/write                                                                                                                                                                                                                                          |
| 9   | Not Writable When Enabled  | 0 = Writable when enabled (e.g., drive running)<br>1 = Not writable when enabled                                                                                                                                                                                         |
| 10  | Instance                   | 0 = Parameter value is not a Reference to another parameter<br>1 = Parameter value refers to another parameter                                                                                                                                                           |
| 11  | Uses Bit ENUM Mask         | This parameter instance supports the Bit ENUM Mask attribute. For more information, see the definition of the attribute.                                                                                                                                                 |
| 12  | Decimal Place (Bit 0)      | Number of digits to the right of the decimal point.<br>0000 = 0<br>1111 = 15                                                                                                                                                                                             |
| 13  | Decimal Place (Bit 1)      |                                                                                                                                                                                                                                                                          |
| 14  | Decimal Place (Bit 2)      |                                                                                                                                                                                                                                                                          |
| 15  | Decimal Place (Bit 3)      |                                                                                                                                                                                                                                                                          |
| 16  | Extended Data Type (Bit 4) | Bit 16 is the least significant bit.                                                                                                                                                                                                                                     |
| 17  | Extended Data Type (Bit 5) | 000 = Reserved                                                                                                                                                                                                                                                           |
| 18  | Extended Data Type (Bit 6) | 001 = UDINT used as an array of Boolean<br>010 = Reserved<br>011 = Reserved<br>100 = Reserved<br>101 = Reserved<br>110 = Reserved<br>111 = Reserved                                                                                                                      |
| 19  | Parameter Exists           | Used to mark parameters that are not available to network tools.                                                                                                                                                                                                         |
| 20  | Not Used                   | Reserved                                                                                                                                                                                                                                                                 |
| 21  | Formula Links              | Indicates the Formula Data is derived from other parameters.                                                                                                                                                                                                             |
| 22  | Access Level (Bit 1)       | A 3-bit field used to control access to parameter data.                                                                                                                                                                                                                  |
| 23  | Access Level (Bit 2)       |                                                                                                                                                                                                                                                                          |
| 24  | Access Level (Bit 3)       |                                                                                                                                                                                                                                                                          |
| 25  | Writable ENUM              | ENUM text: 0 = Read Only, 1 = Read/Write                                                                                                                                                                                                                                 |
| 26  | Not a Link Source          | 0 = May be the source end of a link<br>1 = May not be the source end of a link                                                                                                                                                                                           |
| 27  | Enhanced Bit ENUM          | Parameter supports enhanced bit ENUMs.                                                                                                                                                                                                                                   |
| 28  | Enhanced ENUM              | Parameter supports enhanced ENUMs.                                                                                                                                                                                                                                       |
| 29  | Uses DPI Limits Object     | Parameter uses the DPI Limits Object.<br>Intelligent offline tools make use of the Limits Object to select limits and units.                                                                                                                                             |
| 30  | Extended Descriptor        | Parameter uses Extended Descriptor bits, which can be obtained by reading the DPI Extended Descriptor attribute for this parameter.                                                                                                                                      |
| 31  | Always Upload/Download     | Parameter shall always be included in uploads and downloads.                                                                                                                                                                                                             |

## Extended Descriptor Attributes

| Bit | Name                          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0   | Indirect Mode                 | 0 = Analog (selects entire parameters)<br>1 = Digital (selects individual bits within parameters)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 1   | Indirect Type 0               | Analog input list (Instance 0xFFFF)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 2   | Indirect Type 1               | Digital input list (Instance 0xFFFE)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 3   | Indirect Type 2               | Feedback list (Instance 0xFFFD)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 4   | Indirect Type 3               | Analog output list (Instance 0xFFFC)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 5   | Indirect Type 4               | Digital output list (Instance 0xFFFB)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 6   | Indirect Type 5               | Undefined (Instance 0xFFFA)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 7   | Indirect Type 6               | Undefined (Instance 0xFFFF9)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 8   | Indirect Type 7               | Undefined (Instance 0xFFFF8)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 9   | Indirect Type 8               | Undefined (Instance 0xFFFF7)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 10  | Indirect Type 9               | Undefined (Instance 0xFFFF6)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 11  | Indirect Type 10              | Undefined (Instance 0xFFFF5)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 12  | Indirect Type 11              | Undefined (Instance 0xFFFF4)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 13  | Indirect Type 12              | Undefined (Instance 0xFFFF3)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 14  | Indirect Type 13              | Undefined (Instance 0xFFFF2)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 15  | Indirect Type 14              | Parameter-specific list                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 16  | FP Max Decimals Bit 0         | These four bits are used on REAL parameters only. They indicate the maximum number of decimal places to be displayed for small values. A value of 0 indicates to not limit the number of decimal places used.                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 17  | FP Max Decimals Bit 1         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 18  | FP Max Decimals Bit 2         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 19  | FP Max Decimals Bit 1         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 20  | Extended Parameter Reference  | 0 = Not an Extended Parameter Reference<br>1 = Extended Parameter Reference<br>An Extended Parameter Reference contains a reference to another parameter. The value is formatted the same as an analog mode Indirect Selector parameter (SSpppp, where SS = slot number of device to which this Extended Parameter Reference is pointing, and pppp = number of the parameter or diagnostic item to which this Extended Parameter Reference is pointing). Note that an Extended Parameter Reference can only select parameters unlike an Indirect Selector. An Extended Parameter Reference could be used to configure a Datalink or show the source of a Reference (among other uses). |
| 21  | Uses Rating Table Object      | This parameter has rating-dependent defaults and limits that can be obtained from the Rating Table Object. The Offline Read Full will include the default value for the smallest rating and limits that will accommodate the full range of values allowed in the family of devices using this particular combination of Family Code and Config Code. The Online Read Full will include the rating-dependent default and limit values for this particular combination of Family Code, Config Code, and Rating Code.                                                                                                                                                                     |
| 22  | Writable Referenced Parameter | This bit must be zero unless the parameter is an Extended Parameter Reference. If the parameter is an Extended Parameter Reference, then:<br>0 = The referenced parameter may be read-only or writable.<br>1 = The referenced parameter must always be writable (including while running).                                                                                                                                                                                                                                                                                                                                                                                             |
| 23  | Disallow Zero                 | This bit must be zero unless the parameter is an Indirect Selector or Extended Parameter Reference. If the parameter is an Indirect Selector or Extended Parameter Reference, then:<br>0 = Allow zero<br>1 = Disallow zero<br>If this bit is cleared (indicating that a value of zero is allowed), the device must support the "Zero Text" parameter attribute so that a software tool or HIM can obtain text from the Zero Text parameter attribute.<br>If this bit is set (indicating that a value of zero is disallowed), a software tool or HIM will not allow the user to enter a value of zero.                                                                                  |
| 24  | Datalink Out                  | This bit is used by offline tools and indicates that this is a Datalink Out parameter. Bit 20 must also be set.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 25  | Datalink In                   | This bit is used by offline tools and indicates that this is a Datalink In parameter. Bits 20 and 22 must also be set.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 26  | Not Writable While IO Active  | This parameter cannot be written if the I/O data being exchanged between the Host and the peripheral is valid.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

| Bit   | Name                     | Description                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 27    | Command Parameter        | This parameter commands the drive to take an action, such as “Reset Defaults” or “Autotune,” and then returns to a value of zero. Offline software tools will not allow setting this parameter to anything other than a value of zero. If an offline file contains a Command Parameter with a non-zero value, the offline software tool will change the value to zero. Note that command parameters cannot have values that do not return to zero. |
| 28    | Current Value Is Default | This bit identifies a parameter that will not change if a “Reset Defaults” is commanded. For example, if a drive contains a Language parameter that is set to German, setting defaults will leave the parameter set to German. Likewise, if the parameter is set to French, setting defaults will leave the parameter set to French.                                                                                                               |
| 29    | Use Zero Text            | If the “Disallow Zero” bit is set, this bit must be cleared. If the “Disallow Zero” bit is cleared, then:<br>0 = Use Disabled Text parameter class attribute.<br>1 = Use Zero Text parameter instance attribute.                                                                                                                                                                                                                                   |
| 30-31 | Reserved                 | Reserved                                                                                                                                                                                                                                                                                                                                                                                                                                           |

## Formulas for Converting

Display Value = ((Internal Value + Offset) x Multiplier x Base) / (Divisor x 10<sup>Decimal Places</sup>)

Internal Value = ((Display Value x Divisor x 10<sup>Decimal Places</sup>) / (Multiplier x Base)) - Offset

## Common Services

| Service Code | Implemented for: |          | Service Name         |
|--------------|------------------|----------|----------------------|
|              | Class            | Instance |                      |
| 0x0E         | Yes              | Yes      | Get_Attribute_Single |
| 0x10         | Yes              | Yes      | Set_Attribute_Single |

## Object Specific Services

| Service Code | Implemented for: |          | Service Name             | Allocation Size (in bytes) |            |
|--------------|------------------|----------|--------------------------|----------------------------|------------|
|              | Class            | Instance |                          | Par. Number                | Par. Value |
| 0x4D         | Yes              | No       | Get_Attributes_Scattered | 4                          | 4          |
| 0x4E         | Yes              | No       | Set_Attributes_Scattered | 4                          | 4          |

The table below lists the parameters for the Get\_Attributes\_Scattered and Set\_Attributes\_Scattered object-specific service:

| Name             | Data Type | Description                                          |
|------------------|-----------|------------------------------------------------------|
| Parameter Number | UDINT     | Parameter to read or write                           |
| Parameter Value  | UDINT     | Parameter value to read or write (zero when reading) |

## TCP/IP Interface Object

### Class Code

| Hexadecimal | Decimal |
|-------------|---------|
| 0xF5        | 245     |

### Services

| Service Code | Implemented for: |          | Service Name         |
|--------------|------------------|----------|----------------------|
|              | Class            | Instance |                      |
| 0x0E         | Yes              | Yes      | Get_Attribute_Single |
| 0x10         | No               | Yes      | Set_Attribute_Single |

### Instances

The adapter supports one instance of the TCP/IP Interface object.

| Number | Description       |
|--------|-------------------|
| 0      | Class Attributes  |
| 1      | Object Attributes |

### Class Attributes

| Attribute ID | Access Rule | Name     | Data Type | Description                 |
|--------------|-------------|----------|-----------|-----------------------------|
| 1            | Get         | Revision | WORD      | The revision of this object |

### Instance Attributes

| Attribute ID | Access Rule | Name                               | Data Type                                                | Description                                                                                                                                                                                                                                                                                                                                                                        |
|--------------|-------------|------------------------------------|----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1            | Get         | Status of TCP/IP Network Interface | DWORD                                                    | 0 = Not configured<br>1 = Valid configuration<br>2...15 = Reserved                                                                                                                                                                                                                                                                                                                 |
| 2            | Get         | Configuration Capability           | DWORD                                                    | Bit   Value (0 = False, 1 = True)<br>0 = Supports BOOTP<br>1 = DNS Client (able to resolve host names by query to DNS server)<br>2 = DHCP Client (able to obtain network configuration through DHCP)<br>3 = DHCP-DNS Update (able to send its host name in the DHCP request)<br>4 = Configuration Settable (able to set the network configuration via TCP/IP)<br>5...31 = Reserved |
| 3            | Set         | Configuration Control              | DWORD                                                    | Bit   Value<br>1...3 = Startup configuration<br>0 = Use configuration saved in NVS<br>1 = Obtain configuration via BOOTP<br>2 = Obtain configuration via DHCP<br>3...15 = Reserved<br>4 = DNS Enabled (resolves host names by query to DNS server)<br>5...31 = Reserved                                                                                                            |
| 4            | Get         | Physical Link Object               | STRUCT of:<br>WORD<br>Padded EPATH                       | Path size<br>Path                                                                                                                                                                                                                                                                                                                                                                  |
| 5            | Get         | Interface Configuration            | STRUCT of:<br>DWORD<br>DWORD<br>DWORD<br>DWORD<br>STRING | Adapter's IP address<br>Adapter's subnet mask<br>Adapter's gateway address<br>Primary name server<br>Secondary name server<br>Default domain name                                                                                                                                                                                                                                  |
| 6            | Get         | Host Name                          | STRING                                                   | Host name when using DHCP                                                                                                                                                                                                                                                                                                                                                          |

## Ethernet Link Object

### Class Code

| Hexadecimal | Decimal |
|-------------|---------|
| 0xF6        | 246     |

### Services

| Service Code | Implemented for: |          | Service Name         |
|--------------|------------------|----------|----------------------|
|              | Class            | Instance |                      |
| 0x0E         | Yes              | Yes      | Get_Attribute_Single |
| 0x4C         | No               | Yes      | Get_and_Clear        |

### Instances

The adapter supports one instance of the TCP/IP Interface object.

| Number | Description       |
|--------|-------------------|
| 0      | Class Attributes  |
| 1      | Object Attributes |

### Class Attributes

| Attribute ID | Access Rule | Name     | Data Type | Description                 |
|--------------|-------------|----------|-----------|-----------------------------|
| 1            | Get         | Revision | WORD      | The revision of this object |

### Instance Attributes

| Attribute ID | Access Rule | Name               | Data Type                                                                                                     | Description                                                                                                                                                                                                                                                                                                                                    |
|--------------|-------------|--------------------|---------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1            | Get         | Interface Speed    | DWORD                                                                                                         | Speed in megabits per second (Mbs)                                                                                                                                                                                                                                                                                                             |
| 2            | Get         | Interface Flags    | DWORD                                                                                                         | Bit   Value<br>0 = Link status (0 = inactive, 1 = active)<br>1 = Duplex (0 = half duplex, 1 = full duplex)<br>2...31 = Reserved                                                                                                                                                                                                                |
| 3            | Get         | Physical Address   | BYTE[6]                                                                                                       | MAC address (XX-XX-XX-XX-XX-XX)<br>The first octet (USINT[0]) is on the left.                                                                                                                                                                                                                                                                  |
| 4            | Get         | Interface Counters | STRUCT of:<br>DWORD<br>DWORD<br>DWORD<br>DWORD<br>DWORD<br>DWORD<br>DWORD<br>DWORD<br>DWORD<br>DWORD<br>DWORD | Octets received<br>Unicast packets received<br>Non-unicast packets received<br>Inbound packets received but discarded<br>Inbound packets with errors (not discarded)<br>Inbound packets with unknown protocol<br>Octets sent<br>Unicast packets sent<br>Non-unicast packets sent<br>Outbound packets discarded<br>Outbound packets with errors |

| Attribute ID | Access Rule | Name           | Data Type                                                                                                              | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------|-------------|----------------|------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5            | Get         | Media Counters | STRUCT of:<br>DWORD<br>DWORD<br>DWORD<br>DWORD<br>DWORD<br>DWORD<br>DWORD<br>DWORD<br>DWORD<br>DWORD<br>DWORD<br>DWORD | RX = Received, TX = Transmitted<br>RX frames not having integral number of octets long<br>RX frames not passing FCS check<br>TX frames having one collision<br>TX frames having multiple collisions<br>Number of times of SQE test error message<br>TX Frames delayed first attempt by busy medium<br>Collisions detected later than 512 bit-times in trans.<br>TX frames failing due to excessive collisions<br>TX frames failing due to intern MAC sublayer TX error<br>Times of carrier sense condition loss during trans.<br>RX frames exceeding the maximum frame size<br>RX frames failing due to intern MAC sublayer RX error |

## Logic Command/Status Words

Appendix D presents the definitions of the Logic Command and Logic Status words that are used for some products that can be connected to the adapter. If the Logic Command/Logic Status for the product that you are using is not listed, refer to your product's documentation.

**PowerFlex 70/70EC,  
PowerFlex 700/700VC, and  
PowerFlex 700H Drives**

### Logic Command Word

| Logic Bits |    |    |    |    |    |   |   |   |   |   |   |   |   |   | 0 | Command                         | Description                                                                                                                                                                                                                       |
|------------|----|----|----|----|----|---|---|---|---|---|---|---|---|---|---|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 15         | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |   |                                 |                                                                                                                                                                                                                                   |
|            |    |    |    |    |    |   |   |   |   |   |   |   |   |   | x | Stop <sup>(1)</sup>             | 0 = Not Stop<br>1 = Stop                                                                                                                                                                                                          |
|            |    |    |    |    |    |   |   |   |   |   |   |   |   | x |   | Start <sup>(1)(2)</sup>         | 0 = Not Start<br>1 = Start                                                                                                                                                                                                        |
|            |    |    |    |    |    |   |   |   |   |   |   |   | x |   |   | Jog                             | 0 = Not Jog (Par. 100)<br>1 = Jog                                                                                                                                                                                                 |
|            |    |    |    |    |    |   |   |   |   |   |   | x |   |   |   | Clear Faults                    | 0 = Not Clear Faults<br>1 = Clear Faults                                                                                                                                                                                          |
|            |    |    |    |    |    |   |   |   |   | x | x |   |   |   |   | Direction                       | 00 = No Command<br>01 = Forward Command<br>10 = Reverse Command<br>11 = Hold Direction Control                                                                                                                                    |
|            |    |    |    |    |    |   |   |   | x |   |   |   |   |   |   | Local Control                   | 0 = No Local Control<br>1 = Local Control                                                                                                                                                                                         |
|            |    |    |    |    |    |   |   | x |   |   |   |   |   |   |   | MOP Increment                   | 0 = Not Increment<br>1 = Increment                                                                                                                                                                                                |
|            |    |    |    |    |    | x | x |   |   |   |   |   |   |   |   | Accel Rate                      | 00 = No Command<br>01 = Accel Rate 1 Command (Par. 140)<br>10 = Accel Rate 2 Command (Par. 141)<br>11 = Hold Accel Rate                                                                                                           |
|            |    |    |    | x  | x  |   |   |   |   |   |   |   |   |   |   | Decel Rate                      | 00 = No Command<br>01 = Decel Rate 1 Command (Par. 142)<br>10 = Decel Rate 2 Command (Par. 143)<br>11 = Hold Decel Rate                                                                                                           |
|            | x  | x  | x  |    |    |   |   |   |   |   |   |   |   |   |   | Reference Select <sup>(3)</sup> | 000 = No Command<br>001 = Ref A Select (Par. 90)<br>010 = Ref B Select (Par. 93)<br>011 = Preset 3 (Par. 103)<br>100 = Preset 4 (Par. 104)<br>101 = Preset 5 (Par. 105)<br>110 = Preset 6 (Par. 106)<br>111 = Preset 7 (Par. 107) |
| x          |    |    |    |    |    |   |   |   |   |   |   |   |   |   |   | MOP Decrement                   | 0 = Not Decrement<br>1 = Decrement                                                                                                                                                                                                |

<sup>(1)</sup> A "0 = Not Stop" condition (logic 0) must first be present before a "1 = Start" condition will start the drive. The Start command acts as a momentary Start command. A "1" will start the drive, but returning to "0" will not stop the drive.

<sup>(2)</sup> This Start will not function if a digital input (parameters 361-366) is programmed for 2-Wire Control (option 7, 8 or 9).

<sup>(3)</sup> This Reference Select will not function if a digital input (parameters 361-366) is programmed for "Speed Sel 1, 2 or 3" (option 15, 16 or 17). Note that Reference Select is "Exclusive Ownership" – see drive User Manual for more information.

### Logic Status Word

| Logic Bits |    |    |    |    |    |   |   |   |   |   |   |   |   |   |   | Status                       | Description                                                                                                                                                                                                                                                                                                                                                                                      |
|------------|----|----|----|----|----|---|---|---|---|---|---|---|---|---|---|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 15         | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |                              |                                                                                                                                                                                                                                                                                                                                                                                                  |
|            |    |    |    |    |    |   |   |   |   |   |   |   |   |   | x | Ready                        | 0 = Not Ready (Par. 214)<br>1 = Ready                                                                                                                                                                                                                                                                                                                                                            |
|            |    |    |    |    |    |   |   |   |   |   |   |   |   | x |   | Active                       | 0 = Not Active (Running)<br>1 = Active                                                                                                                                                                                                                                                                                                                                                           |
|            |    |    |    |    |    |   |   |   |   |   |   |   | x |   |   | Command Direction            | 0 = Reverse<br>1 = Forward                                                                                                                                                                                                                                                                                                                                                                       |
|            |    |    |    |    |    |   |   |   |   |   | x |   |   |   |   | Actual Direction             | 0 = Reverse<br>1 = Forward                                                                                                                                                                                                                                                                                                                                                                       |
|            |    |    |    |    |    |   |   |   |   | x |   |   |   |   |   | Accel                        | 0 = Not Accelerating<br>1 = Accelerating                                                                                                                                                                                                                                                                                                                                                         |
|            |    |    |    |    |    |   |   |   | x |   |   |   |   |   |   | Decel                        | 0 = Not Decelerating<br>1 = Decelerating                                                                                                                                                                                                                                                                                                                                                         |
|            |    |    |    |    |    |   |   | x |   |   |   |   |   |   |   | Alarm                        | 0 = No Alarm (Par. 211 & 212)<br>1 = Alarm                                                                                                                                                                                                                                                                                                                                                       |
|            |    |    |    |    |    |   | x |   |   |   |   |   |   |   |   | Fault                        | 0 = No Fault (Par. 243)<br>1 = Fault                                                                                                                                                                                                                                                                                                                                                             |
|            |    |    |    |    |    | x |   |   |   |   |   |   |   |   |   | At Speed                     | 0 = Not At Reference<br>1 = At Reference                                                                                                                                                                                                                                                                                                                                                         |
|            |    |    |    | x  | x  | x |   |   |   |   |   |   |   |   |   | Local Control <sup>(1)</sup> | 000 = Port 0 (TB)<br>001 = Port 1<br>010 = Port 2<br>011 = Port 3<br>100 = Port 4<br>101 = Port 5<br>110 = Port 6<br>111 = No Local                                                                                                                                                                                                                                                              |
| x          | x  | x  | x  |    |    |   |   |   |   |   |   |   |   |   |   |                              |                                                                                                                                                                                                                                                                                                                                                                                                  |
|            |    |    |    |    |    |   |   |   |   |   |   |   |   |   |   | Reference                    | 0000 = Ref A Auto (Par. 90)<br>0001 = Ref B Auto (Par. 93)<br>0010 = Preset 2 Auto<br>0011 = Preset 3 Auto<br>0100 = Preset 4 Auto<br>0101 = Preset 5 Auto<br>0110 = Preset 6 Auto<br>0111 = Preset 7 Auto<br>1000 = Term Blk Manual<br>1001 = DPI 1 Manual<br>1010 = DPI 2 Manual<br>1011 = DPI 3 Manual<br>1100 = DPI 4 Manual<br>1101 = DPI 5 Manual<br>1110 = DPI 6 Manual<br>1111 = Jog Ref |

<sup>(1)</sup> See "Owners" in drive User Manual for further information.

### Logic Command Word (Phase II Control)

- (1) A Not Stop condition (logic bit 0 = 0, logic bit 8 = 0, and logic bit 9 = 0) must first be present before a 1 = Start condition will start the drive.
- (2) To perform this command, the value must switch from "0" to "1."

### Logic Status Word (Phase II Control)

| Logic Bits |    |    |    |    |    |   |   |   |   |   |   |   |   |   |   | Status                  | Description                                         |
|------------|----|----|----|----|----|---|---|---|---|---|---|---|---|---|---|-------------------------|-----------------------------------------------------|
| 15         | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |                         |                                                     |
|            |    |    |    |    |    |   |   |   |   |   |   |   |   |   | x | Active                  | 0 = Not Active<br>1 = Active                        |
|            |    |    |    |    |    |   |   |   |   |   |   |   |   | x |   | Running                 | 0 = Not Running<br>1 = Running                      |
|            |    |    |    |    |    |   |   |   |   |   |   |   | x |   |   | Command Direction       | 0 = Reverse<br>1 = Forward                          |
|            |    |    |    |    |    |   |   |   |   |   |   | x |   |   |   | Actual Direction        | 0 = Reverse<br>1 = Forward                          |
|            |    |    |    |    |    |   |   |   |   |   | x |   |   |   |   | Accel                   | 0 = Not Accelerating<br>1 = Accelerating            |
|            |    |    |    |    |    |   |   |   |   | x |   |   |   |   |   | Decel                   | 0 = Not Decelerating<br>1 = Decelerating            |
|            |    |    |    |    |    |   |   |   | x |   |   |   |   |   |   | Jogging                 | 0 = Not Jogging<br>1 = Jogging                      |
|            |    |    |    |    |    |   |   | x |   |   |   |   |   |   |   | Fault                   | 0 = No Fault (Par. 323, 324, 325)<br>1 = Fault      |
|            |    |    |    |    |    |   | x |   |   |   |   |   |   |   |   | Alarm                   | 0 = No Alarm (Par. 326, 327, 328)<br>1 = Alarm      |
|            |    |    |    |    |    | x |   |   |   |   |   |   |   |   |   | Flash Mode              | 0 = Not in Flash Mode<br>1 = In Flash Mode          |
|            |    |    |    |    | x  |   |   |   |   |   |   |   |   |   |   | Run Ready               | 0 = Not Ready to Run (Par. 156)<br>1 = Ready to Run |
|            |    |    |    | x  |    |   |   |   |   |   |   |   |   |   |   | At Limit <sup>(1)</sup> | 0 = Not At Limit (Par. 304)<br>1 = At Limit         |
|            |    |    | x  |    |    |   |   |   |   |   |   |   |   |   |   | Tach Loss Sw            | 0 = Not Tach Loss Sw<br>1 = Tach Loss Sw            |
|            |    | x  |    |    |    |   |   |   |   |   |   |   |   |   |   | At Zero Spd             | 0 = Not At Zero Speed<br>1 = At Zero Speed          |
|            | x  |    |    |    |    |   |   |   |   |   |   |   |   |   |   | At Setpt Spd            | 0 = Not At Setpoint Speed<br>1 = At Setpoint Speed  |
| x          |    |    |    |    |    |   |   |   |   |   |   |   |   |   |   | Enable                  | 0 = Not Enabled<br>1 = Enabled                      |

<sup>(1)</sup> See Parameter 304 - [Limit Status] in the PowerFlex 700S drive User Manual for a description of the limit status conditions.

**PowerFlex 750-Series Drives** **Important:** When using a 20-COMM-E adapter with a PowerFlex 750-Series drive, the upper word (bits 16...31) of the Logic Command and Logic Status words are not accessible and cannot be used. Only when using a PowerFlex 750-Series drive with a 20-750 communication Option Module (or the PowerFlex 755 drive's embedded EtherNet/IP adapter) is the upper word accessible and used.

### Logic Command Word

| Logic Bits |    |    |    |    |    |   |   |   |   |   |   |   |   |   |   | Command                    | Description                                                                                                      |
|------------|----|----|----|----|----|---|---|---|---|---|---|---|---|---|---|----------------------------|------------------------------------------------------------------------------------------------------------------|
| 31...15    | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |                            |                                                                                                                  |
|            |    |    |    |    |    |   |   |   |   |   |   |   |   |   | x | Normal Stop                | 0 = Not Normal Stop<br>1 = Normal Stop                                                                           |
|            |    |    |    |    |    |   |   |   |   |   |   |   |   | x |   | Start <sup>(1)</sup>       | 0 = Not Start<br>1 = Start                                                                                       |
|            |    |    |    |    |    |   |   |   |   |   |   |   | x |   |   | Jog 1 <sup>(2)</sup>       | 0 = Not Jog 1 (Par. 556)<br>1 = Jog 1                                                                            |
|            |    |    |    |    |    |   |   |   |   |   |   | x |   |   |   | Clear Fault <sup>(3)</sup> | 0 = Not Clear Fault<br>1 = Clear Fault                                                                           |
|            |    |    |    |    |    |   |   |   |   | x | x |   |   |   |   | Unipolar Direction         | 00 = No Command<br>01 = Forward Command<br>10 = Reverse Command<br>11 = Hold Direction Control                   |
|            |    |    |    |    |    |   |   |   | x |   |   |   |   |   |   | Manual                     | 0 = Not Manual<br>1 = Manual                                                                                     |
|            |    |    |    |    |    |   |   | x |   |   |   |   |   |   |   | Reserved                   |                                                                                                                  |
|            |    |    |    |    |    | x | x |   |   |   |   |   |   |   |   | Accel Time                 | 00 = No Command<br>01 = Use Accel Time 1 (Par. 535)<br>10 = Use Accel Time 2 (Par. 536)<br>11 = Use Present Time |
|            |    |    |    | x  | x  |   |   |   |   |   |   |   |   |   |   | Decel Time                 | 00 = No Command<br>01 = Use Decel Time 1 (Par. 537)<br>10 = Use Decel Time 2 (Par. 538)<br>11 = Use Present Time |
|            |    |    | x  |    |    |   |   |   |   |   |   |   |   |   |   | Ref Select 1               | 000 = No Command                                                                                                 |
|            |    | x  |    |    |    |   |   |   |   |   |   |   |   |   |   | Ref Select 2               | 001 = Ref A Select (Par. 545)                                                                                    |
|            | x  |    |    |    |    |   |   |   |   |   |   |   |   |   |   | Ref Select 3               | 010 = Ref B Select (Par. 550)                                                                                    |
|            |    |    |    |    |    |   |   |   |   |   |   |   |   |   |   |                            | 011 = Preset 3 (Par. 573)                                                                                        |
|            |    |    |    |    |    |   |   |   |   |   |   |   |   |   |   |                            | 100 = Preset 4 (Par. 574)                                                                                        |
|            |    |    |    |    |    |   |   |   |   |   |   |   |   |   |   |                            | 101 = Preset 5 (Par. 575)                                                                                        |
|            |    |    |    |    |    |   |   |   |   |   |   |   |   |   |   |                            | 110 = Preset 6 (Par. 576)                                                                                        |
|            |    |    |    |    |    |   |   |   |   |   |   |   |   |   |   |                            | 111 = Preset 7 (Par. 577)                                                                                        |
| x          |    |    |    |    |    |   |   |   |   |   |   |   |   |   |   | Reserved                   |                                                                                                                  |

<sup>(1)</sup> A Not Stop condition (logic bit 0 = 0) must first be present before a 1 = Start condition will start the drive.

<sup>(2)</sup> A Not Stop condition (logic bit 0 = 0) must first be present before a 1 = Jog 1/Jog 2 condition will jog the drive. A transition to a "0" will stop the drive.

<sup>(3)</sup> To perform this command, the value must switch from "0" to "1."

## Logic Status Word

| Logic Bits |    |    |    |    |    |   |   |   |   |   |   |   |   |   |   | Command           | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------|----|----|----|----|----|---|---|---|---|---|---|---|---|---|---|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 31...15    | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|            |    |    |    |    |    |   |   |   |   |   |   |   |   |   | x | Run Ready         | 0 = Not Ready to Run (Par. 933)<br>1 = Ready to Run                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|            |    |    |    |    |    |   |   |   |   |   |   |   |   | x |   | Active            | 0 = Not Active<br>1 = Active                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|            |    |    |    |    |    |   |   |   |   |   |   |   | x |   |   | Command Direction | 0 = Reverse<br>1 = Forward                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|            |    |    |    |    |    |   |   |   |   |   |   | x |   |   |   | Actual Direction  | 0 = Reverse<br>1 = Forward                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|            |    |    |    |    |    |   |   |   |   |   | x |   |   |   |   | Accelerating      | 0 = Not Accelerating<br>1 = Accelerating                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|            |    |    |    |    |    |   |   |   |   | x |   |   |   |   |   | Decelerating      | 0 = Not Decelerating<br>1 = Decelerating                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|            |    |    |    |    |    |   |   |   | x |   |   |   |   |   |   | Alarm             | 0 = No Alarm (Par. 959 and 960)<br>1 = Alarm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|            |    |    |    |    |    |   |   | x |   |   |   |   |   |   |   | Fault             | 0 = No Fault (Par. 952 and 953)<br>1 = Fault                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|            |    |    |    |    |    |   | x |   |   |   |   |   |   |   |   | At Setpt Spd      | 0 = Not at Setpoint Speed<br>1 = At Setpoint Speed                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|            |    |    |    |    |    | x |   |   |   |   |   |   |   |   |   | Manual            | 0 = Manual Mode Not Active<br>1 = Manual Mode Active                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|            |    |    |    |    | x  |   |   |   |   |   |   |   |   |   |   | Spd Ref ID 0      | 00000 = Reserved                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|            |    |    |    | x  |    |   |   |   |   |   |   |   |   |   |   | Spd Ref ID 1      | 00001 = Auto Ref A (Par. 545)<br>00010 = Auto Ref B (Par. 550)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|            |    |    | x  |    |    |   |   |   |   |   |   |   |   |   |   | Spd Ref ID 2      | 00011 = Auto Preset Speed 3 (Par. 573)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|            |    | x  |    |    |    |   |   |   |   |   |   |   |   |   |   | Spd Ref ID 3      | 00100 = Auto Preset Speed 4 (Par. 574)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|            | x  |    |    |    |    |   |   |   |   |   |   |   |   |   |   | Spd Ref ID 4      | 00101 = Auto Preset Speed 5 (Par. 575)<br>00110 = Auto Preset Speed 6 (Par. 576)<br>00111 = Auto Preset Speed 7 (Par. 577)<br>01000 = Reserved<br>01001 = Reserved<br>01010 = Reserved<br>01011 = Reserved<br>01100 = Reserved<br>01101 = Reserved<br>01110 = Reserved<br>01111 = Reserved<br>10000 = Man Port 0<br>10001 = Man Port 1<br>10010 = Man Port 2<br>10011 = Man Port 3<br>10100 = Man Port 4<br>10101 = Man Port 5<br>10110 = Man Port 6<br>10111 = Reserved<br>11000 = Reserved<br>11001 = Reserved<br>11010 = Reserved<br>11011 = Reserved<br>11100 = Reserved<br>11101 = Man Port 13 (Emb. ENET)<br>11110 = Man Port 14 (Drive Logix)<br>11111 = Alternate Man Ref Sel |
| x          |    |    |    |    |    |   |   |   |   |   |   |   |   |   |   | Reserved          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

### **A Adapter**

Devices such as drives, controllers, and computers usually require an adapter to provide a communication interface between them and a network such as EtherNet/IP. An adapter reads data on the network and transmits it to the connected device. It also reads data in the device and transmits it to the network.

The 20-COMM-E EtherNet/IP adapter connects PowerFlex 7-Class drives to an EtherNet/IP network. Adapters are sometimes also called “cards,” “embedded communication options,” “gateways,” “modules,” and “peripherals.”

### **B BOOTP (Bootstrap Protocol)**

BOOTP lets the adapter configure itself dynamically at boot time if the network has a BOOTP server. The BOOTP server assigns the adapter a preconfigured IP address, a subnet mask, and a gateway address; therefore, you do not have to configure these using the parameters in the adapter. BOOTP can make it easier to administer an Ethernet network. A free version of Rockwell Software’s BOOTP Server can be accessed at <http://www.software.rockwell.com/support/download/detail.cfm?ID=3390>.

### **Bridge**

A network device that can route messages from one network to another. A bridge also refers to a communications module in a ControlLogix controller that connects the controller to a network. See also Scanner.

### **C CAN (Controller Area Network)**

CAN is a serial bus protocol on which DPI is based.

### **CIP (Common Industrial Protocol)**

CIP is the transport and application layer protocol used for messaging over EtherNet/IP, ControlNet, and DeviceNet networks. The protocol is used for implicit messaging (real-time I/O) and explicit messaging (configuration, data collection, and diagnostics).

### **ControlFLASH**

An Allen-Bradley software tool that lets users electronically update firmware on printed circuit boards.

### **Controller**

A controller, also called programmable logic controller, is a solid-state control system that has a user-programmable memory for storage of instructions to implement specific functions such as I/O control, logic, timing, counting, report generation, communication, arithmetic, and data file manipulation. A controller consists of a central processor, input/output interface, and memory. See also Scanner.

**D Data Rate**

The speed at which data is transferred on the EtherNet/IP network. You can set the adapter to a data rate of 10 Mbps Full-Duplex, 10 Mbps Half-Duplex, 100 Mbps Full-Duplex, or 100 Mbps Half-Duplex. If another device on the network sets or auto-negotiates the data rate, you can set the adapter to automatically detect the data rate.

**Datalinks**

A Datalink is a type of pointer used by PowerFlex 7-Class drives to transfer data to and from the controller. Datalinks allow specified parameters to be read or written to without using explicit messages. When enabled, each Datalink consumes either four bytes or eight bytes in both the input and output image table of the controller. The drive determines the size of Datalinks.

**DPI (Drive Peripheral Interface)**

A second generation peripheral communication interface used by various Allen-Bradley drives and power products, such as PowerFlex 7-Class drives. It is a functional enhancement to SCANport.

**DPI Peripheral**

A device that provides an interface between DPI and a network or user. Peripheral devices are also referred to as “adapters” or “modules.” The 20-COMM-E adapter, 1203-USB or 1203-SSS converter, and PowerFlex 7-Class HIMs (20-HIM-xxx) are examples of DPI peripherals.

**DPI Product**

A device that uses the DPI communications interface to communicate with one or more peripheral devices. For example, a motor drive such as a PowerFlex 7-Class drive is a DPI product. In this manual, a DPI product is also referred to as “drive” or “host.”

**DriveExplorer Software**

A tool for monitoring and configuring Allen-Bradley products and adapters. It can be run on computers running various Microsoft Windows operating systems. DriveExplorer (version 3.xx or higher) can be used to configure this adapter and PowerFlex drives. Information about DriveExplorer software and a free lite version can be accessed at <http://www.ab.com/drives/driveexplorer>.

**DriveTools SP Software**

A software suite designed for running on various Microsoft Windows operating systems. This software suite provides a family of tools, including DriveExecutive, that you can use to program, monitor, control, troubleshoot, and maintain Allen-Bradley products. DriveTools SP can be used with PowerFlex drives. Information about DriveTools SP can be accessed at <http://www.ab.com/drives/drivetools>.

**Duplex**

Duplex describes the mode of communication. *Full-duplex* communications let a device exchange data in both directions at the same time. *Half-duplex* communications let a device exchange data only in one direction at a time. The duplex used by the adapter depends on the type of duplex that other network devices, such as switches, support.

**E EDS (Electronic Data Sheet) Files**

Simple text files that are used by network configuration tools such as RSNetWorx for EtherNet to describe products so that you can easily commission them on a network. EDS files describe a product device type and revision. EDS files for many Allen-Bradley products can be found at <http://www.ab.com/networks/eds>.

**EtherNet/IP Network**

EtherNet/IP (Industrial Protocol) is an open producer-consumer communication network based on the Ethernet standard (IEEE 802.3), TCP/IP, UDP/IP, and CIP. Designed for industrial communications, both I/O and explicit messages can be transmitted over the network. Each device is assigned a unique IP address and transmits data on the network. The number of devices that an EtherNet/IP network can support depends on the class of IP address. For example, a network with a Class C IP address can have 254 nodes.

General information about EtherNet/IP and the EtherNet/IP specification are maintained by the Open DeviceNet Vendor's Association (ODVA). ODVA is online at <http://www.odva.org>.

**Explicit Messaging**

Explicit Messages are used to transfer data that does not require continuous updates. They are typically used to configure, monitor, and diagnose devices over the network.

**F Fault Action**

A fault action determines how the adapter and connected drive act when a communications fault (for example, a cable is disconnected) occurs or when the controller is switched out of run mode. The former uses a communications fault action, and the latter uses an idle fault action.

**Fault Configuration**

When communications are disrupted (for example, a cable is disconnected), the adapter and PowerFlex drive can respond with a user-defined fault configuration. The user sets the data that is sent to the drive using specific fault configuration parameters in the adapter. When a fault action parameter is set to use the fault configuration data and a fault occurs, the data from these parameters is sent as the Logic Command, Reference, and/or Datalink(s).

**Flash Update**

The process of updating firmware in a device. The adapter can be flash updated using various Allen-Bradley software tools. Refer to [Flash Updating the Adapter on page 3-18](#) for more information.

**G Gateway**

A device on a network that connects an individual network to a system of networks. When a node needs to communicate with a node on another network, a gateway transfers the data between the two networks. You need to configure the address for the gateway device in the adapter if you want the adapter to communicate with devices that are not on its network.

**H Hardware Address**

Each Ethernet device has a unique hardware address (sometimes called a MAC address) that is 48 bits. The address appears as six digits separated by colons (for example, xx:xx:xx:xx:xx:xx). Each digit has a value between 0 and 255 (0x00 and 0xFF). This address is assigned in the hardware and cannot be changed. It is required to identify the device if you are using a BOOTP utility.

**HIM (Human Interface Module)**

A device that can be used to configure and control a drive. PowerFlex 7-Class HIMs (20-HIM-xxx) can be used to configure PowerFlex 7-Class drives and their connected peripherals.

**Hold Last**

When communication is disrupted (for example, a cable is disconnected), the adapter and PowerFlex drive can respond by holding last. Hold last results in the drive receiving the last data received via the network connection before the disruption. If the drive was running and using the Reference from the adapter, it will continue to run at the same Reference.

**Host Parameters (PowerFlex 750-Series drives only)**

Host parameters are used to configure peripherals connected to a PowerFlex 750-Series drive. Host parameters, when viewed using DriveExplorer or DriveExecutive, appear below the specific peripheral listing in the treeview in a separate Host Parameters folder. When using a PowerFlex 7-Class HIM (20-HIM-A3/-A5/-C3S/-C5S), these parameters do not appear. When viewed using a PowerFlex 750-Series HIM (20-HIM-A6/-C6S), these parameters appear in the HOST PARAM folder.

**I Idle Action**

An idle action determines how the adapter and connected drive act when the controller is switched out of run mode.

## I/O Data

I/O data, sometimes called “implicit messages” or “input/output,” is time-critical data such as a Logic Command and Reference. The terms “input” and “output” are defined from the controller’s point of view. Output is produced by the controller and consumed by the adapter. Input is produced by the adapter and consumed by the controller.

## IP Addresses

A unique IP address identifies each node on an EtherNet/IP network. An IP address consists of 32 bits that are divided into four segments of one byte each. It appears as four decimal integers separated by periods (xxx.xxx.xxx.xxx). Each “xxx” can have a decimal value from 0 to 255. For example, an IP address could be 192.168.0.1.

An IP address has two parts: a network ID and a host ID. The class of network determines the format of the address.

|         |   |            |            |            |   |         |         |    |         |    |    |
|---------|---|------------|------------|------------|---|---------|---------|----|---------|----|----|
|         | 0 | 1          |            | 7          |   | 15      |         | 23 |         | 31 |    |
| Class A | 0 | Network ID |            |            |   | Host ID |         |    |         |    |    |
|         | 0 | 1          |            | 7          |   | 15      |         | 23 |         | 31 |    |
| Class B | 1 | 0          | Network ID |            |   |         | Host ID |    |         |    |    |
|         | 0 | 1          | 2          |            | 7 |         | 15      |    | 23      |    | 31 |
| Class C | 1 | 1          | 0          | Network ID |   |         |         |    | Host ID |    |    |

The number of devices on your EtherNet/IP network will vary depending on the number of bytes that are used for the network address. In many cases you are given a network with a Class C address, in which the first three bytes contain the network address (subnet mask = 255.255.255.0). This leaves 8 bits or 256 addresses on your network. Because two addresses are reserved for special uses (0 is an address for the network usually used by the router, and 255 is an address for broadcast messages to all network devices), you have 254 addresses to use on a Class C address block.

To ensure that each device on the Internet has a unique address, contact your network administrator or Internet Service Provider for unique fixed IP addresses. You can then set the unique IP address for the adapter by using a BOOTP server or by manually configuring parameters in the adapter. The adapter reads the values of these parameters only at power-up.

## L Logic Command/Logic Status

The Logic Command is used to control the PowerFlex 7-Class drive (for example, start, stop, direction). It consists of one 16-bit word of output to the adapter from the network. The definitions of the bits in this word depend on the drive, and are shown in [Appendix D](#).

The Logic Status is used to monitor the PowerFlex 7-Class drive (for example, operating state, motor direction). It consists of one 16-bit word of input from the adapter to the network. The definitions of the bits in this word depend on the drive, and are shown in [Appendix D](#).

**M Master-Slave Hierarchy**

An adapter configured for a master-slave hierarchy exchanges data with the master device. Usually, a network has one scanner which is the master device, and all other devices (for example, drives connected to EtherNet/IP adapters) are slave devices.

On a network with multiple scanners (called a multimaster hierarchy), each slave device must have a scanner specified as a master.

**N NVS (Non-Volatile Storage)**

NVS is the permanent memory of a device. Devices such as the adapter and drive store parameters and other information in NVS so that they are not lost when the device loses power. NVS is sometimes called “EEPROM.”

**P PCCC (Programmable Controller Communications Command)**

PCCC is the protocol used by some controllers to communicate with devices on a network. Some software products (for example, DriveExplorer and DriveExecutive) also use PCCC to communicate.

**Peer-to-Peer Hierarchy**

An adapter that is configured for a peer-to-peer hierarchy can exchange data with a device on the network that is not a scanner. This type of hierarchy can be set up so that a scanner configures or transmits data to one PowerFlex 7-Class drive which then sends the same configuration or data to other PowerFlex 7-Class drives on the network. To use a peer-to-peer hierarchy, you configure one adapter to transmit data (2 or 4 words) and one or more adapters to receive the data.

**Ping**

A message that is sent by a DPI product to its peripheral devices. They use the ping to gather data about the product, including whether it can receive messages and whether they can log in for control. On EtherNet/IP, a ping can be used to determine if a node exists.

**PowerFlex 7-Class (Architecture Class) Drives**

The Allen-Bradley PowerFlex 7-Class family of drives supports DPI and, at the time of publication, includes the PowerFlex 70, PowerFlex 700, PowerFlex 700H, PowerFlex 700S, PowerFlex 700L, and PowerFlex 7000.

**PowerFlex 750-Series (Architecture Class) Drives**

The Allen-Bradley PowerFlex 750-Series of drives supports DPI and, at the time of publication, includes the PowerFlex 753 and PowerFlex 755.

## **R Reference/Feedback**

The Reference is used to send a setpoint (for example, speed, frequency, torque) to the drive. It consists of one word of output to the adapter from the network. The size of the word (either a 16-bit word or 32-bit word) is determined by the drive.

Feedback is used to monitor the speed of the drive. It consists of one word of input from the adapter to the network. The size of the word (either a 16-bit word or 32-bit word) is determined by the drive.

### **RSLogix 5/500/5000**

RSLogix software is a tool for configuring and monitoring controllers to communicate with connected devices. It is a 32-bit application that runs on various Windows operating systems. Information about RSLogix software can be found at <http://www.software.rockwell.com/rslogix>.

## **S Scanner**

A scanner is a separate module (of a multi-module controller) or a built-in component (of a single-module controller) that provides communication with adapters connected to a network. See also Controller.

### **Status Indicators**

Status indicators are LEDs that are used to report the status of the adapter, network, and drive. They are on the adapter and can be viewed on the front cover of the drive when the drive is powered.

### **Subnet Mask**

An extension to the IP addressing scheme that lets you use a single network ID for multiple physical networks. A bit mask identifies the part of the address that specifies the network and the part of the address that specifies the unique node on the network. A “1” in the subnet mask indicates the bit is used to specify the network. A “0” in the subnet mask indicates that the bit is used to specify the node.

For example, a subnet mask on a network may appear as follows: 11111111 11111111 11111111 11000000 (255.255.255.192). This mask indicates that 26 bits are used to identify the network and 6 bits are used to identify devices on each network. Instead of a single physical Class C network with 254 devices, this subnet mask divides it into four networks with up to 62 devices each.

### **Switches**

Network devices that provide virtual connections that help to control collisions and reduce traffic on the network. They are able to reduce network congestion by transmitting packets to an individual port only if they are destined for the connected device. In a control application, in which real time data access is critical, network switches may be required in place of hubs.

**T TCP (Transmission Control Protocol)**

EtherNet/IP uses this protocol to transfer Explicit Messaging packets using IP. TCP guarantees delivery of data through the use of retries.

**U UDP (User Datagram Protocol)**

EtherNet/IP uses this protocol to transfer I/O packets using IP. UDP provides a simple, but fast capability to send I/O messaging packets between devices. This protocol ensures that adapters transmit the most recent data because it does not use acknowledgements or retries.

**Z Zero Data**

When communications are disrupted (for example, a cable is disconnected), the adapter and drive can respond with zero data. Zero data results in the drive receiving zero as values for Logic Command, Reference, and Datalink data. If the drive was running and using the Reference from the adapter, it will stay running but at zero Reference.

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